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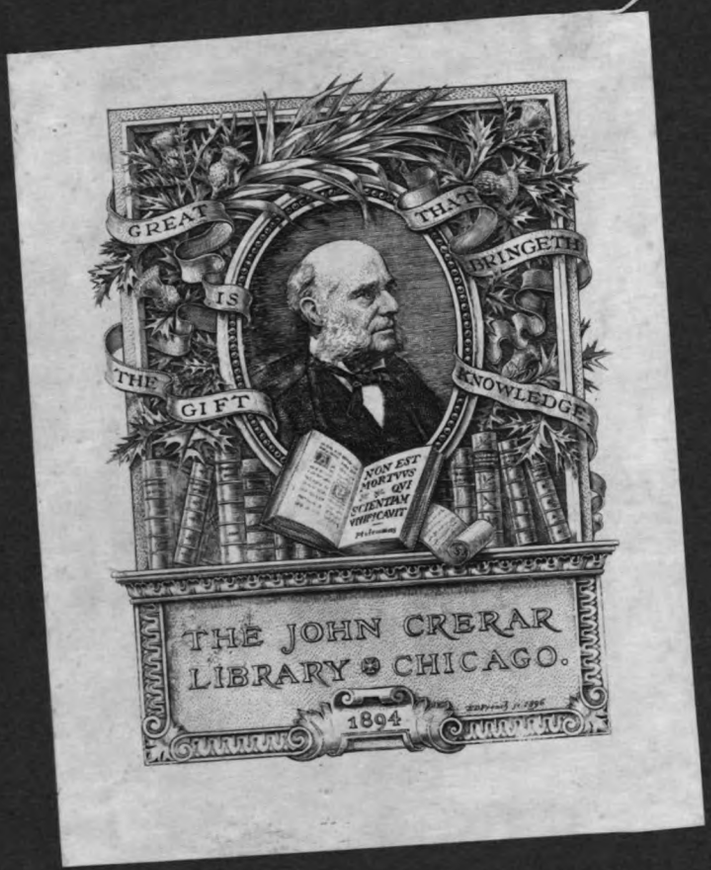

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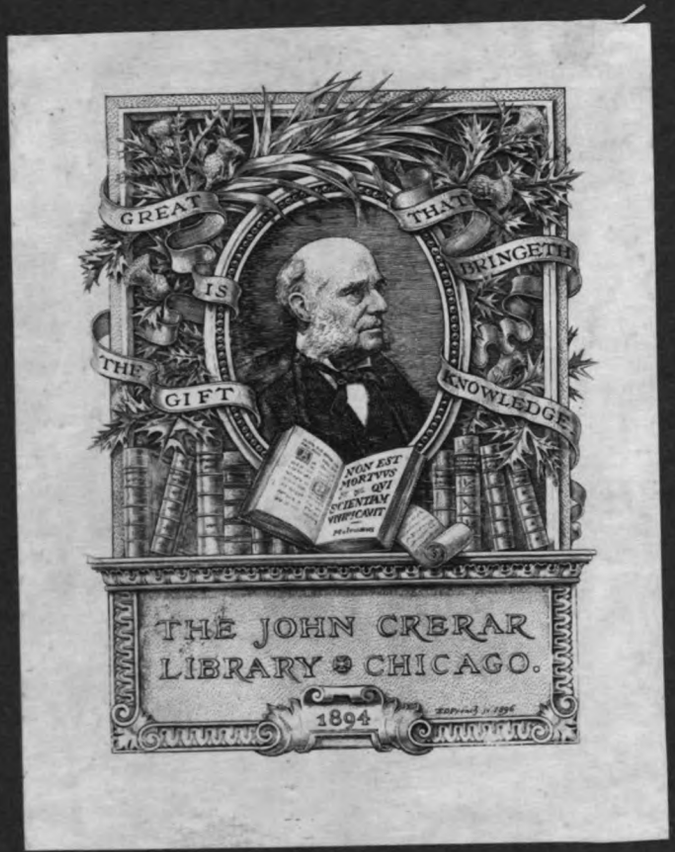

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POWER WAGON

Number 182 CHICAGO, JANUARY, 1920 Price 15 Cents

Why the Notches?

The notches or side vents in a Kelly Caterpillar tire are not put there for ornament.

They serve a very definite purpose—several, in fact.

First: They give greater traction. They enable the tire to grip the road surface. A Kelly Caterpillar can roll serenely over a road on which the ordinary tire would be helpless without chains.

Second: They greatly increase the tire's resiliency. In a Caterpillar the rubber displaced under load pressure has somewhere to go—and it can go there quickly.

Third: The traction wave is practically done away with. It is broken every few inches so that it has little opportunity to damage the tire or hold back the truck.

These are merely the advantages which the side vents **add** to a tire that even without them would be in a class by itself.

Kelly-Springfield Tire Co.

GENERAL SALES DEPARTMENT:
4614 Prospect Ave., Cleveland, O.

Protected by U. S. Patents
June 28, 1904 Aug. 31 1915 Mar. 14, 1916 Feb. 19, 1918

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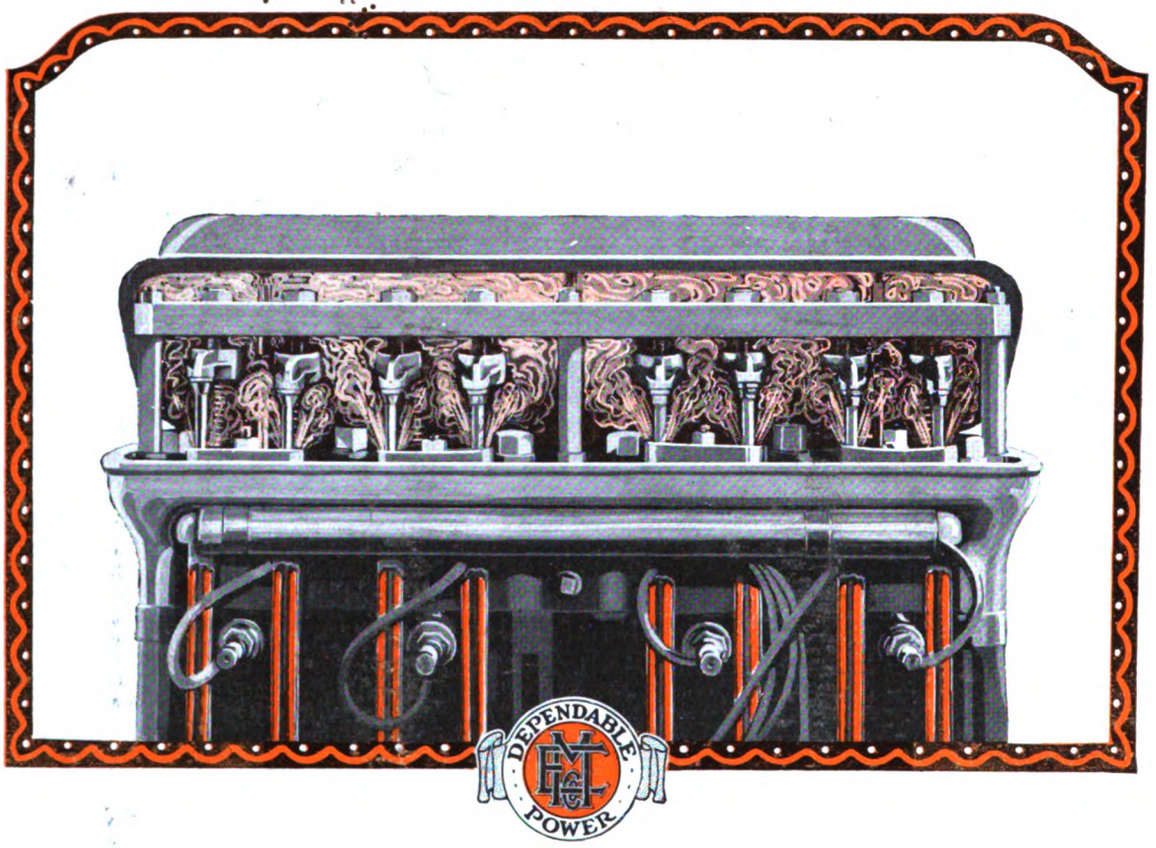
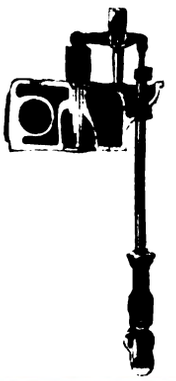
MIDWEST

TRUCK *and* TRACTOR ENGINE



This Midwest Engine is unique in that it belongs essentially to these new, high speed times. It is built to pull a heavy truck *loaded to capacity*—at comparatively high engine speed; whereas, until now, practically all truck engines have been designed for slow speed—and have been, as a rule, unfitted for the incessant torture of high speed made possible by the almost general adoption of pneumatic tires—on trucks.

Above is shown only one of the Midwest precautionary and protective features. Note how a fog of lubricant (arbitrarily indicated by red) is drawn up the eight tubes surrounding the push rods. The rocker arms and valve mechanism are constantly bathed in this oil mist, thereby reducing friction and wear to the minimum. Bear in mind, too, that all this is merely a part of an automatic internal "breathing" operation—no gritty outside air can possibly enter this motor—meaning *no cutting out of bearings*.



There are other distinctive and gratifying features in this Midwest engine, over which any sincere engineering student will become enthusiastic. May we send you the full facts?

Address, Sales Division 16.

Midwest Engine Co.

Indianapolis, U.S.A.

Dependable Power

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Leading truck manufacturers are using more Long Cooling Units than any other make of radiator.

THE important function of the cooling unit has spurred the Long organization through 18 years of specialized effort to perfect a principle of radiation that would afford the utmost cooling efficiency. The success of Long Cooling Systems is attested by their widespread adoption in the automotive industry. No engine can be more efficient than its cooling system.

Long Manufacturing Co., Detroit, Mich.

Pioneer Makers of Cooling Systems for Gasoline Engines

LONG COOLING SYSTEMS

The Recognized Standard for Motor Trucks, Tractors and Motor Cars

433508
203257
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"NORMA"

PRECISION BALL BEARINGS

(PATENTED)

One of the few things not affected by the World War or by conditions which have followed—is "NORMA" Quality. Prices of materials and labor have changed. But in all the essentials that define value, "NORMA" standards have been inflexibly maintained — regardless of cost.

See that your electrical apparatus is "NORMA" equipped.

THE NORMA COMPANY OF AMERICA

Anable Avenue, Long Island City

NEW YORK

Ball, Roller, Thrust and Combination Bearings

POWER WAGON

An exponent of the most enlightened thought and practice of the motor truck industry.

Published monthly by

THE POWER WAGON PUBLISHING COMPANY

544 Lake Shore Drive, Chicago

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CHICAGO

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CLARE S. ACTON
205-6 Kresge Bldg.

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ROSS STEERING GEARS

Motor Trucks Equipped with Ross Steering Gears

297 [redacted]

Nearest Competitor Ross Nearly 5 Times as Many

65 [redacted]

Next Competitor Ross Nearly 6 Times as Many

54 [redacted]

Next Competitor Ross Over 8 Times as Many

37 [redacted]

5 Other Competitors Ross Eleven Times as Many

27 [redacted]

Trucks Listed but Steering Gear Equipment Not Given

11 [redacted]

THE Commercial Car Journal for November 15, 1919, contains complete specifications of 526 different motor-truck models. On 35 models the manufacturers use their own steering gear. Ross Steering Gears are used on 297 of the 491 models that are open to competition. The chart above, drawn to scale, shows graphically the extent to which Ross Steering Gears Predominate on Motor Trucks. These figures have a vital significance for every man who manufactures or who buys a motor truck.

Write for further information about the Safety, Reliabiilty, and Easy Operation of Ross Steering Gears

Ross Gear & Tool Company
780 Heath St., Lafayette Ind.

THE STEERING GEARS THAT PREDOMINATE ON MOTOR TRUCKS

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U S MOTOR FLOATING POWER PLANT TRUCKS

Auto Show
Chicago
January
24 to 31
Inclusive

See Our Big Display

during Auto Show Week in the lobby of the

HOTEL SHERMAN

Clark and Randolph, Chicago

Dealers—Distributors—We will show a complete line of United States Motor Trucks, NINETEEN TWENTY MODELS, in down town Chicago, at the Sherman House lobby.

Come and see us. Meet our executives. Make your headquarters here. Have your mail sent in our care.

Examine these new models of worm drive trucks—3,000, 4,000, 6,000, 8,000 and 12,000 pound capacities. Also 1½ ton Farm Truck with five-way convertible body. This is the finest complete truck line ever offered.

United States Motor Trucks are the latest word in motor truck design, construction, quality, efficiency and economy of operation. They meet every haulage requirement.

Nowhere else can the dealer find such a line of trucks to sell—trucks which give the user so much for his money. These trucks will sell fast.

WIRE TODAY

Open territory is being closed rapidly. Ask about yours. Have it reserved until you can see us. Our dealer proposition is the most attractive one offered in years.

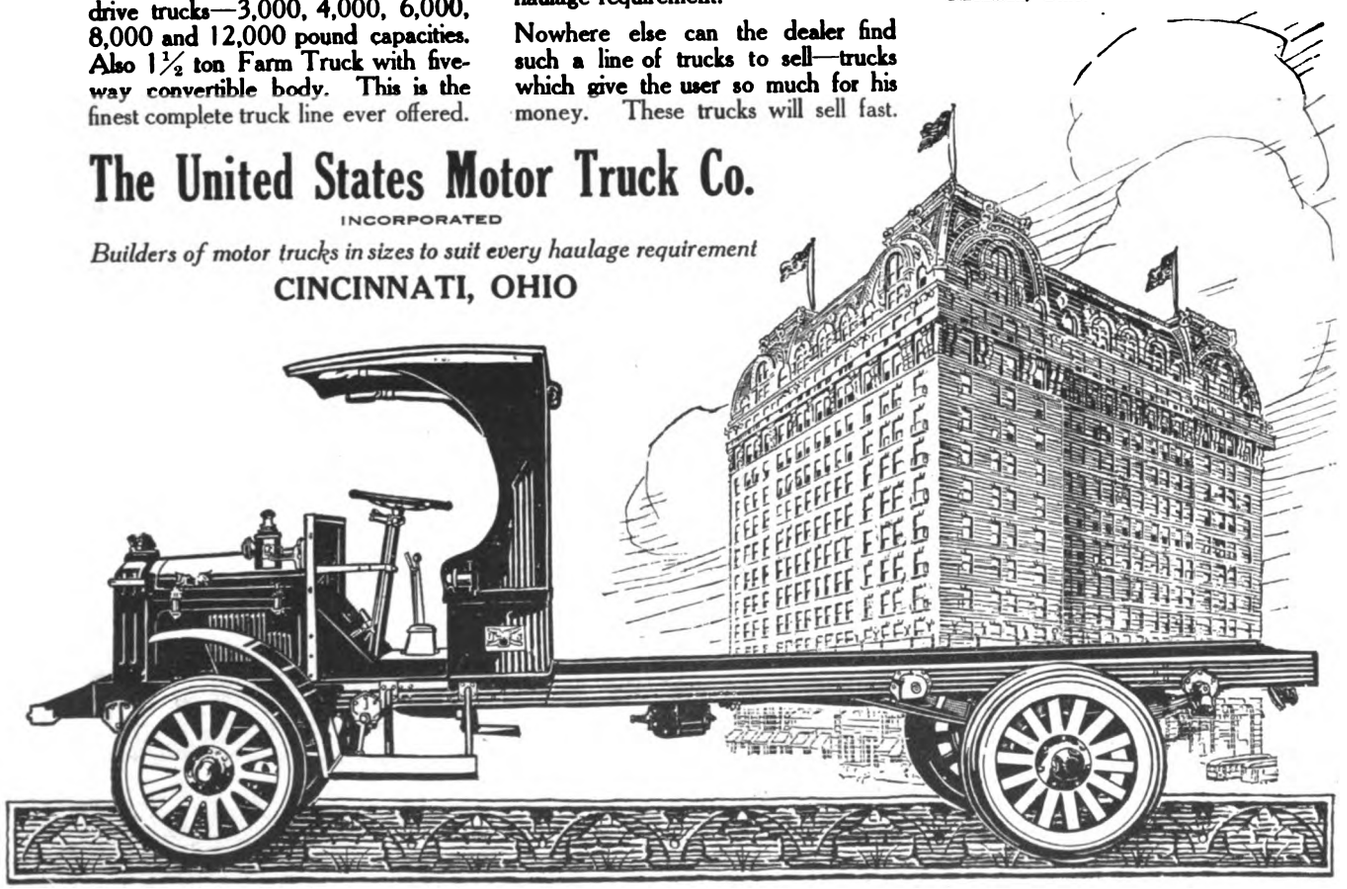
To facilitate prompt attention, address Mr. W. R. Kyle, The United States Motor Truck Co., Cincinnati, Ohio.

The United States Motor Truck Co.

INCORPORATED

Builders of motor trucks in sizes to suit every haulage requirement

CINCINNATI, OHIO



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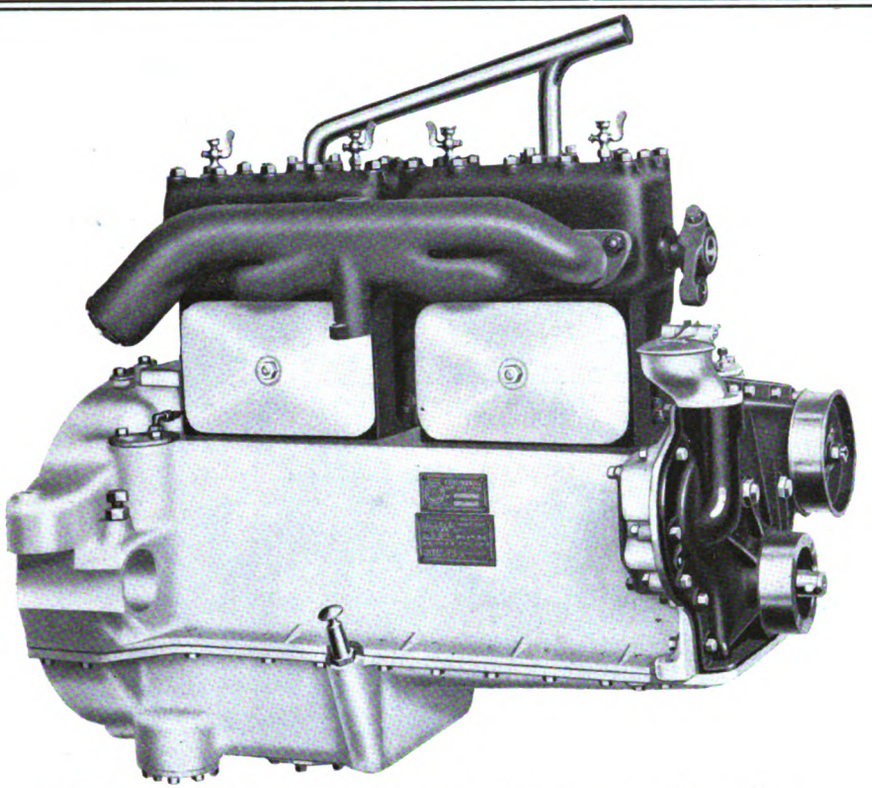

The first exhibit of the new Red Seal Motors

The Continental Motors Corporation announces the first exhibit of the new Red Seal Motors at the New York and Chicago Shows.

These motors represent the judgment accumulated through seventeen years of the experience of the world's largest exclusive manufacturers.

Visitors at the shows are invited to inspect the exhibits which will be found at:

PASSENGER CAR SHOWS

NEW YORK—Grand Central Palace—Booth C-47.

CHICAGO—Coliseum—Booth 50-51.

TRUCK SHOWS

NEW YORK — 8th Coast Artillery Armory Main Floor—Space 14-15-16.

CHICAGO — International Ampitheatre Gallery—Space 16-17.

CONTINENTAL MOTORS CORPORATION

Offices:
Detroit, Michigan

Factories:
Muskegon—Detroit

Largest Exclusive Motor Manufac urers in the World

The CONTINENTAL MOTORS ★ AMERICA'S STANDARD ★ Powerful as the Nation Red Seal Motor

Continental Motors

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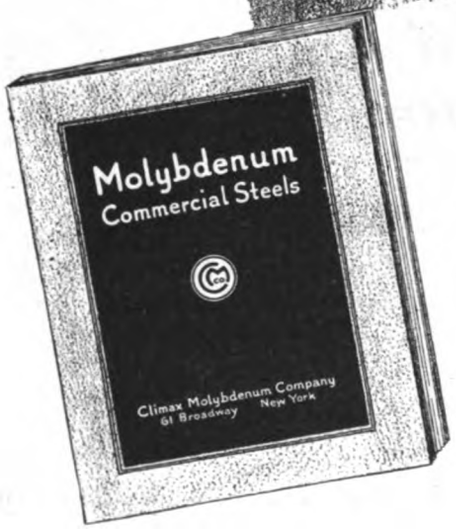
Molybdenum Steels



Mo-
lyb-
den-
um

The Facts About Molybdenum

FACTS gathered from the commercial production of scores of thousands of tons of Molybdenum Steels, during the War and since, have for the *first time* been set forth in book form.

Classified in "Types", the properties and heat treatments of each are fully yet briefly described, with the aid of tables and colored charts.

This book—"Molybdenum Commercial Steels"—**has been read and approved in detail, before publication, by officials and metallurgists of some of the largest alloy steel manufacturers and consumers in the United States. All of the data conservatively represent the results of their experience with many thousands of tons commercially produced and commercially used.**

Copies may be obtained by addressing

Climax Molybdenum Company—or—The American Metal Company Ltd.
61 Broadway ——— New York

Climax Molybdenum Company is the Largest Producer of Molybdenum in the World

Proven in War for the Tasks of Peace

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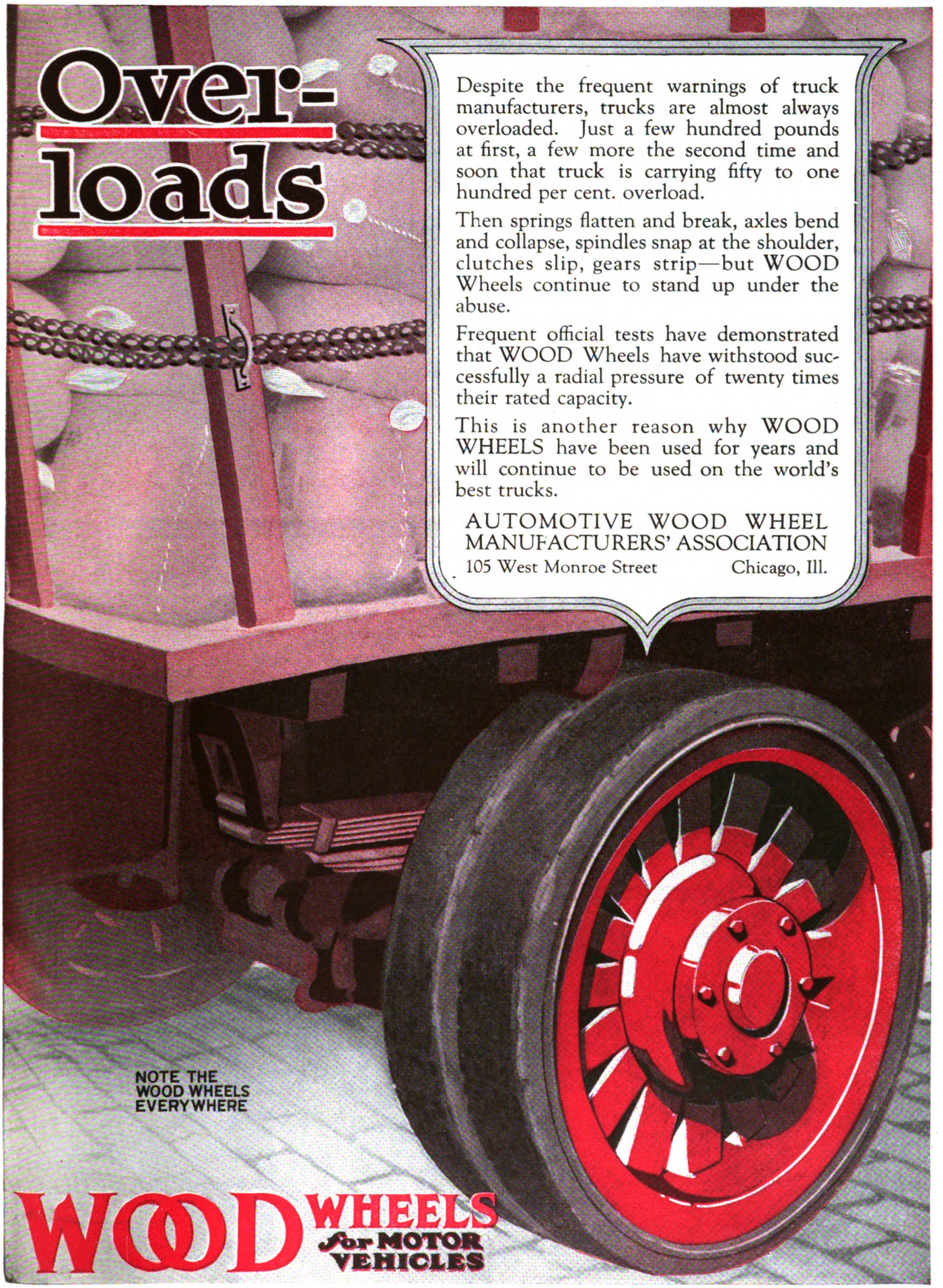

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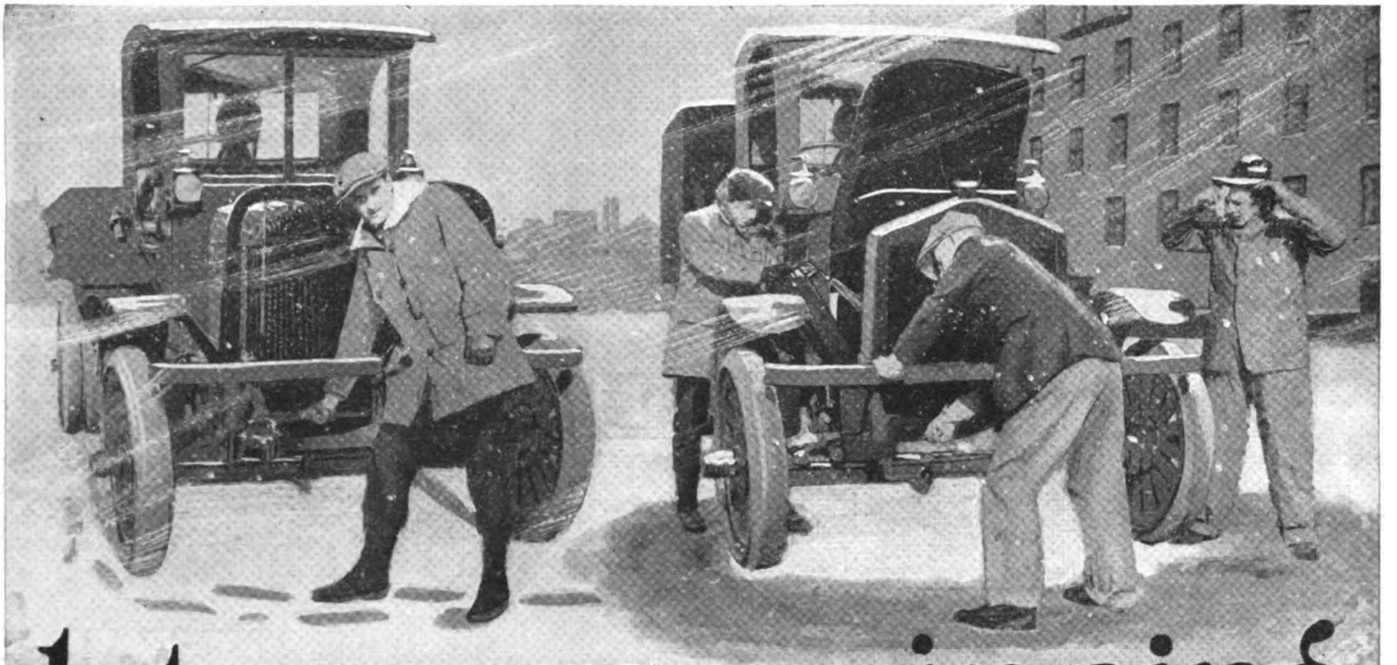
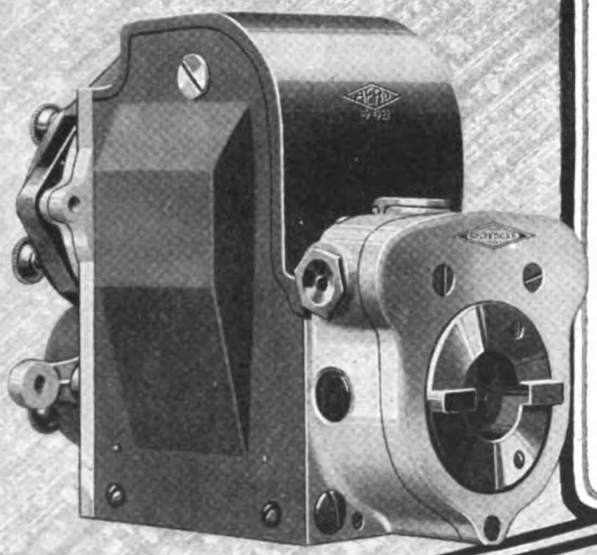


¼ turn vs. spinning

Splitdorf "Aero" Magneto with Enclosed Automatic Impulse Starter

Standard equipment on such trucks as Mack, Pierce-Arrow, Garford, etc.



A cold, stiff engine will start easily if equipped with Splitdorf Magneto and Enclosed Automatic Impulse Starter. No back-breaking effort necessary even when the thermometer hovers around zero.

The Impulse Starter is a part of the coupling used in driving the magneto.

A quarter turn of the crank shaft, on compression stroke, releases a spring within this device. The released spring energy twirls the magneto shaft to a speed far in advance of the crank shaft speed, producing an extra hot spark in the charge to be fired. The stiffest engine starts instantly.

The cutting in and cutting out of the Splitdorf Impulse Starter is entirely automatic. When the Impulse Starter is functioning the spark is automatically retarded regardless of spark-lever position, positively eliminating back-firing.

Safe and dependable—always dependable.

SPLITDORF ELECTRICAL COMPANY
Newark, N. J.

TRADE
SPLITDORF
MARK

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PATRIOT

Powerful Motor Trucks

Patriot Trucks, like early American Patriots, are known for their simplicity, sturdiness and dependability under heavy responsibilities.

Their performance may reasonably be compared with the naval exploits of Paul Jones.

In satisfactory operation they suggest a striking similarity to the thoroughness and efficiency of Alexander Hamilton.

Their cost of upkeep would have delighted the frugal soul of Benjamin Franklin.

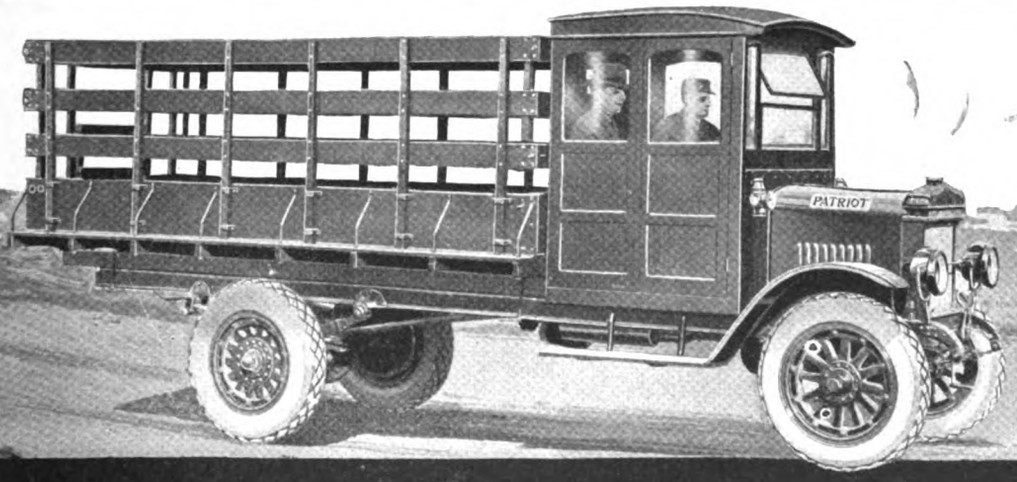
In the rapidity with which their distribution throughout the United States has been effected, they resemble the despatch that characterized the military movements of "Mad Anthony" Wayne.

We are conscious of our self-esteem in tracing a parallel between the quality of Patriot Trucks and the characteristics of early American Patriots, but the comparisons are fully justified by the records that have been made by this business and its products.

Naturally, we are interested in hearing from possible Distributors and Dealers in territory not yet assigned, and in sending full information to any possible purchaser of a truck in any part of the world.

HEBB MOTORS COMPANY

1397 P Street **Lincoln, Nebr.**



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KELLOGG Engine Driven Tire Pump

ACHIEVEMENT

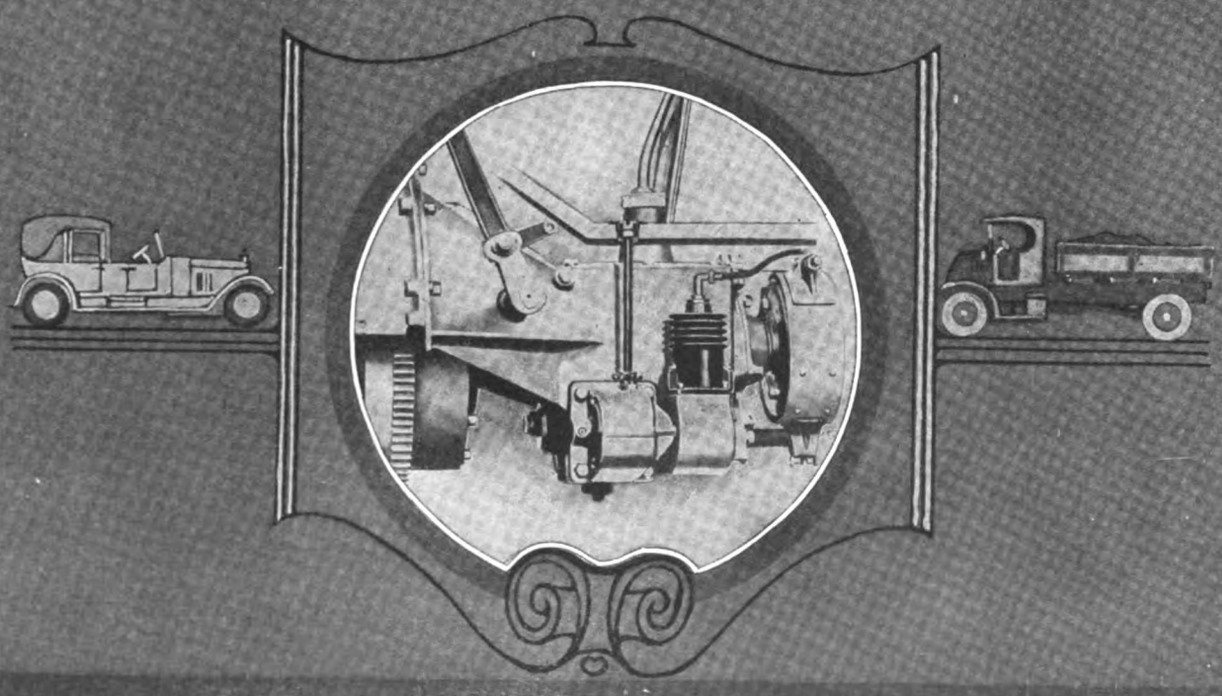
THE Kellogg Engine Driven Tire Pump is used as *standard equipment* by over forty motor car and truck manufacturers. The best engineering brains that this great industry could summon have tested it for every conceivable weakness—and then selected it for use on their products.

This verdict has the approving support of half a million car owners who have found what it means to have air *always* "on tap"—a pump always ready to meet an emergency or perform its day-to-day routine.

And with the latest tire development—the giant pneumatic for trucks, the Kellogg Pump is the indispensable equipment.

To have achieved such striking success is some indication of the painstaking care and accuracy back of Kellogg manufacturing.

KELLOGG MFG. COMPANY . . . ROCHESTER, N. Y.



Please mention "Power Wagon" when writing to advertisers.

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The New Federal One Tonner

With the long-awaited Federal one tonner now ready for distribution, the advantages of a Federal franchise were never so great as now.

The new Federal one tonner is a real one ton truck. It was conceived as a one ton job from the very first blue prints in the Draughting Room to the final O. K.'d design in the office of our Chief Engineer.

The Federal one tonner is built to hard, real duty truck standards —yet with the advantages of more power, speed, electric lights, pressed steel frame, disc steel wheels, pneumatic cord tires and a governor controlled speed of 25 miles per hour.

FEDERAL MOTOR TRUCK COMPANY
DETROIT, MICHIGAN

FEDERAL

One to Five Ton Capacities

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MONEY

The truck business for 1920 offers dealers a real opportunity.

It depends, of course, on the truck they pick.

But if they pick the right one the rest is just a matter of plain common sense business.

The Winther is not the only good truck on the market, but it is one of the few.

Correct in design, sound in manufacturing and engineering practice, made of the best materials by the most skilled workmen, the Winther is a sure money maker for every dealer who ties up to it.

Over and above that, the Winther policy is to protect its dealers at all times. The policy is more than fair and square in favor of the dealer.

The Winther line is well advertised.

WIN

Please mention "Power Wagon" when writing to advertisers.

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MAKERS

We will create a demand right in your territory for you.

That's the kind of co-operation that keeps the cash register ringing.

We have the facilities for big production. Then we can give you the trucks when you want them.

Every dealer who takes on the Winther line will start making money this year, and his profits will increase as the years of Winther development roll by.

Winther expansion plans are a concrete, definite policy. They will develop you and your future business activities.

Better get in touch with us today.

1½ to 7 ton rear driven.
1½, 2½ and 3½ ton four wheel drives.

WINTHER MOTOR TRUCK CO.
Kenosha, Wis.

THER

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GOODYEAR

Pneumatics Protect Loads for This Produce Company

"PNEUMATICS offer all-around advantages over solid tires in our hauling—save trucks, loads and improve working spirit of drivers. They require 1½ less gallons of gasoline on a 90-mile run. Solid-tired trucks sway over the road but trucks on pneumatics run straight. Goodyear Cords are giving excellent service."—P. P. Triller, Purchasing Agent, The Wadley Company, Produce Wholesalers, Indianapolis, Indiana

Twenty-five motor trucks distribute poultry, eggs and butter for The Wadley Company throughout central Indiana.

During the past year Goodyear Cord Pneumatic Truck Tires have demonstrated their ability to reduce time and costs in comparison with solid tires in this service.

A 90-mile trip has been made repeatedly on the pneumatics in 3 less hours with 1½ less gallons of gasoline than when covered by a solid-tired truck.

Due to the jarring and shifting action of trucks on solid tires delicate produce has been damaged frequently whereas the pneumatics prevent such loss.

Mud has stalled the solid-tired trucks but the gripping Goodyear Cords have proved dependable under all adverse road conditions by reason of their firm traction.

An official describes the present mechanical condition of a Goodyear-Cord-equipped truck as being far better than could be expected on solid tires after a similar long term of hard work.

The photograph at the left affords additional and important evidence by showing Goodyear Cord Pneumatic Truck Tires still on duty after nearly a year of continuous hauling.

So this narrative confirms the many other records of Goodyear Cord Pneumatic Truck Tires that have saved trucks, loads, fuel, time and labor.

It indicates the force of Goodyear pioneering work in developing Goodyear Cord Pneumatic Truck Tires, Goodyear Truck Tire Tubes, Rims and Repair Materials and in co-operating with others developing proper engine pumps, pressure gauges and vulcanizing equipment.

Information concerning pneumatic equipment for motor trucks and its results can be obtained from local Goodyear Truck Tire Service Stations or by writing to The Goodyear Tire & Rubber Company, at Akron, Ohio.

CORD TIRES

More Economical Motor Transportation Means More Motor Trucks

The swift arrival of the cord pneumatic truck tire has been felt by the motor truck industry in an increased demand for motor trucks.

Having removed every limitation placed upon motor trucks by solid tires the big pneumatic has broken down formidable barriers to motor truck sales.

This far-reaching result, of course, reflects that long period of Goodyear pioneering work by which the cord pneumatic truck tire was made thoroughly practical and tremendously effective.

It also reflects those pioneering campaigns with which this organization continually has sought to secure the widest adoption of the cord pneumatic truck tire.

Copyright 1920, by The Goodyear Tire & Rubber Co., Akron, O.

GOODYEAR

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But, today, this result is being stimulated powerfully by the present phase of Goodyear effort, which now includes utmost co-operation with manufacturers and dealers in the marketing of motor trucks.

All such manufacturers and dealers are invited to write to us for proof of the economy and efficiency of pneumatic-tired trucks in many fields, industrial and rural.

We are prepared to help you, as a maker or dealer, to secure the utmost benefit from the "Haul on Pneumatics" movement which, in turn, means the utmost benefit to your customers.

Every prospective truck buyer is interested in seeing actual truck cost records, and we are prepared to supply copies of such records kept by users of pneumatic-tired trucks.

Some of your present customers undoubtedly would like to know *how much* others save when hauling a certain load unit on pneumatics—perhaps a bushel of wheat, a pound of dry goods, or a yard of sand.

Let us assist you to spread such information wherever it will tend to increase users' success with motor trucks.

Let us help you demonstrate that the method described by the phrase, "Haul On Pneumatics," does develop utmost efficiency and economy in motor truck transportation.

It enables business houses to deliver at lower cost
It enables farmers to increase crops and incomes
It enables motor express men to haul more goods and make larger profits
It enables bus lines to carry more passengers at less cost per passenger mile
It enables a better co-ordination of transportation to and from waterways, and to and from railroads

For operating and cost data pertaining to the industrial or rural use of pneumatic-tired trucks, write to The Goodyear Tire & Rubber Company, at Akron, Ohio.

CORD TIRES

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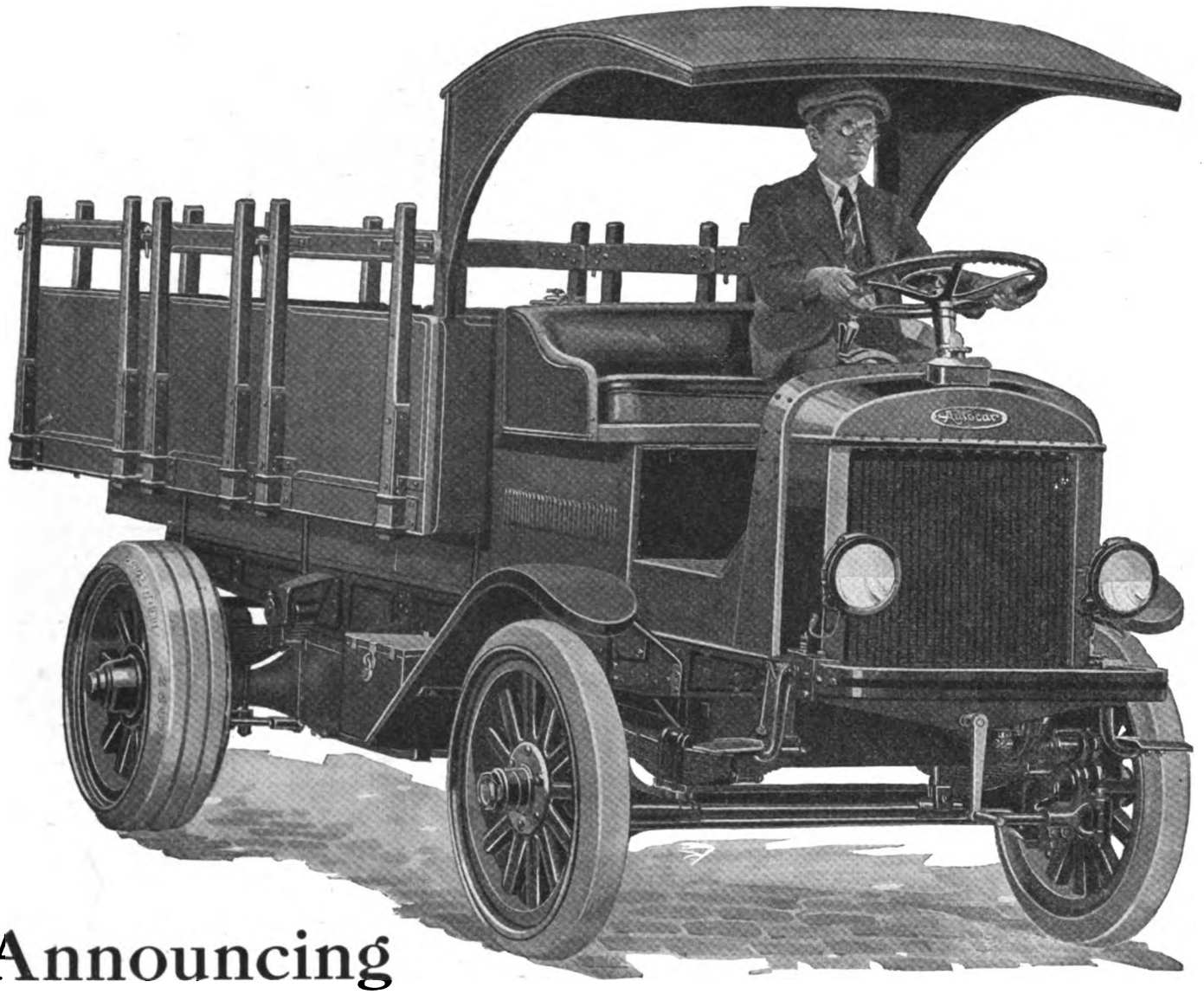

Announcing
an Addition to the Autocar Line

Both
This New 120-inch Wheelbase, Heavy Duty Autocar, and the 97- and 120-inch Wheelbase 1½-2 Ton Autocars will be exhibited:

New York Truck Show
January 3 to 10
8th Coast Artillery Armory

Chicago Truck Show
January 24 to 31
International Amphitheatre

This new heavy duty motor truck has behind it the prestige, the resources and the unusual service organization of The Autocar Company.

The short wheelbase design and double reduction gear drive, distinctive of all Autocar construction, are embodied in this heavier Autocar.

THE AUTOCAR COMPANY, *Ardmore, Pa.* **Established 1897**

The Autocar Sales and Service Company

New York	Boston	Philadelphia	Chicago	Pittsburgh	San Francisco
Brooklyn	Providence	Allentown	St. Louis	Los Angeles	Sacramento
Bronx	Worcester	Wilmington	Baltimore	San Diego	Fresno
Newark	New Haven	Atlantic City	Washington	Oakland	Stockton

Represented by these Factory Branches, with Dealers in other cities.

Autocar

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POWER WAGON

Vol. XXIV. CHICAGO, JANUARY, 1920. No. 182

Selden Sells 1400 Trucks for $5,000,000 in Europe

SAID TO BE LARGEST ORDER ON RECORD

What is said to be the largest single order ever placed for motor trucks, for purely commercial uses, either in this or any other country, has been closed by the Selden Truck Corporation of Rochester, New York. The contract calls for fourteen hundred Selden motor trucks to be delivered on a monthly schedule, the whole contract to be completed within twelve months from January 1, delivery to be made by the Selden company at port in New York.

When asked concerning this, Robert H. Salmons, vice president of the company, said: "Yes, it is true that we have closed such a contract and plans are already under way for the handling of what is without a doubt the largest single order ever placed for motor trucks to be used for commercial purposes. For the past year W. F. Reynolds has been covering the foreign field, with headquarters in

(*Continued on page 19.*)

New "F. J." Worm Gear Develops 97 Per Cent Efficiency at Normal

Members of the technical and semi-techincal press were recently entertained by David Brown & Sons (Hudd.), Ltd., England. The purpose of the dinner was to afford an opportunity for bringing forward some most interesting results of tests by the National Physical Laboratory of the new "F. J." worm gear. This gear was brought out just before the war, but its production was interfered with in consequence of the war. A most interesting point about the new gear is that there is never less than two-line contact, whereas in the older type at certain points of the revolution of the worm, one-line contact is found. The efficiency figures obtained by the National Physical Laboratory are remarkable, and average over 97 per centum efficiency at normal running speeds and loads.

$600,000 for Truck Lines

A new motor transportation concern, the Northern Transportation Company, has been incorporated at Madison, Wisconsin, with a capital stock of $600,000. Milwaukee will be the central operating point of the new company, which, it is thought, will be the largest concern of its kind in Wisconsin. Transportation routes from Milwaukee will cover every city in the state. Passenger, freight and express service lines will be started.

Chicago Meeting of S. A. E. to Be Held at La Salle Hotel January 28

A meeting of the Society of Automotive Engineers devoted to discussions of truck and tractor subjects will be held at the Hotel LaSalle, Chicago, on January 28, 1920, Wednesday of Chicago automobile show week. There will be professional sessions in the morning and afternoon. Following these, in the evening, will be held in the grand ballroom of the Hotel LaSalle. The great S. A. E. Chicago dinner. Chicago now holds the record for having staged the largest S. A. E. dinner ever held.

Among the papers tentatively scheduled for presentation at the Chicago meeting are the following:

"Design of Pneumatic Tired Trucks," by P. W. Litchfield.

"Decreasing Unsprung Weight by Use of Aluminum," by A. H. Edgerton.

"Effect of Tire Equipment on Truck Design," by S. V. Norton.

"Standardization of Military Tractor Engines," author to be announced.

"Tractor Testing for Rating Purposes," by Professor L. W. Chase.

Uncle Sam Fixes Maximum Speed Limit for Army Transport Corps

The service division of the Army's Motor Transport Corps has prescribed maximum limits of speed, both in town and country, for all motor vehicles under its jurisdiction; a case of emergency furnishing the only exception. Instructions also provide that speed plates giving the maximum speed allowed be stenciled and installed in every motor vehicle; that violations will be carefully noted, disciplinary measures promptly taken, and that local speed regulations will not be violated.

The speed regulations, as stated in the order, are:

Vehicle and Type.	In town. M. P. H.	Outside of town. M. P. H.
Trucks, Class AA	12	20
Trucks, Class A	12	15
Trucks, Class B	3	14
Ambulance	12	18
Light delivery, ¾-ton capacity or less	12	20
Small passenger vehicles	15	25
Motorcyles without side cars	18	35
Motorcycles with side cars	18	30
Heavy passenger vehicles	18	35

Conference Programs Are Arranged for Big Shows

AFTERNOON AND EVENING SESSIONS

That the Highway Transport Conferences, to be held in conjunction with the National Motor Truck Shows at New York and Chicago will be the most comprehensive and important yet held, is indicated by the announcement made of the subjects to be discussed.

The feature of the conference sessions will be the liberal use of illustrations, both in the nature of stereopticon slides and motion picture films. An added feature will be motion picture shows, lasting one-half hour or more, and following the sessoins, each afternoon and evening. For these "movies" a large number of films, dealing with motor transportation in all

(*Continued on page 24.*)

National Tractor Demonstrations Give Way to Three-Show Program

E. W. McCullough, secretary of the National Implement and Vehicle Dealers' Association, announces that the tractor department has decided, following a two-day conference, that there will be no more national demonstrations. In the place of them there will be as many as three national shows, where the tractor will be exhibited in its latest stage, with accessories, etc. These shows will be staged at Kansas City, Minneapolis and one eastern city to be selected later. The local demonstrations are to be left optional with the manufacturer wholly. The reason for the abandonment of the national shows was the tremendous expense which eventually entered into the cost of the tractor and it was also felt that the tractor needed no apologies and no explanation. According to Mr. McCullough, the manufacturers are coöperating with the agricultural department of the government to establish a national rating on each tractor which will be recognized as legitimate on this side of the water as well as with export trade.

Quakers Show January 19 to 24

Under the combined auspices of the Motor Truck Association and the Automobile Trade Association, Philadelphia will have its next motor truck show in the Commercial Museum Building from January 19 to 24, the week following the passenger car show.

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Firestone Plans to Build $5,000,000 Plant in Canada

NEW FACTORY TO EMPLOY 20,000 PERSONS

AKRON, OHIO, Dec. 19, 1919.—Announcement is made by the Firestone Tire & Rubber Company of the formation of the Firestone Tire & Rubber Company, of Canada, Ltd., with a capitalization of $5,000,000. According to the announcement a factory which will be erected at Hamilton, Ontario, will begin operations in five months, with a daily capacity of 3,500 tires of all types. Approximately 2,000 persons will be employed. The company has bought 135 acres of ground at Hamilton. Upon one-half of this plot it will build modern factory buildings with an initial floor space of 320,000 square feet. Upon the other half the company will carry out a housing plan for employes similar to that in Firestone Park, which is a model home community.

The established manufacturing and business of the parent company will prevail in the new organization, the announcement said, but it will operate as a Canadian business employing Canadian men and women. The new factory will be constructed on the unit plan, to allow for expansion as additional facilities are required. Building operations are already under way at Hamilton, it was learned. Machine shops for construction work have been established in a factory formerly manufacturing munitions. All buildings will be fireproof, of steel and concrete, and modern in every respect.

In addition to the products made at Akron, the new company will manufacture a line of mechanical goods, including belting. It is probable that a boot and shoe department will be established. Plans are now being prepared for the manufacture of steel rims, and a plant of this nature will soon be under way. The parent company now has 17,000 employees. It is capitalized at $75,000,000. The sales forecast for 1920 calls for an output of over $120,000,000.00.

Franklin Manufacturing Company To Make 1-ton Air-Cooled Truck

Announcement is made by H. H. Franklin, president of the H. H. Franklin Manufacturing Company, that the company will engage in the making of 1-ton Franklin motor trucks in a plant separate and distinct from the present factories for the manufacture of passenger cars.

Plans, as developed thus far, call for production of the new output in about twelve months. It will be a pneumatic-tired machine and will be designed and made to occupy the same place, relatively, in the motor truck field that the Franklin passenger car occupies in its sphere. The features of light weight, economical operating costs and general high class will be depended upon to create demand for the new car.

The company will specialize in the 1-ton machine because it is believed the widest field is offered for a vehicle of this kind. It has in mind development of the use of motor trucks by farmers, and the Franklin, with its air-cooled motor and its adaptability to country highways and even farm lands, is expected to supply a demand that will be great.

Many details remain to be completed before manufacture is actually begun, but plans are far enough along to guarantee the establishment of a concern which will doubtless develop into a large industry under the same heads, but separate in its entirety in location from the present plants.

George Drake Smith Elected Vice President of the Winther Company

The Board of Directors of the Winther Motor Truck Company announces that George Drake Smith has been elected vice president and a member of the board of directors of the company. Mr. Smith came to the company to reorganize the sales, advertising and service departments, and has with the aid of his assistants doubled the shipments for the month of November, and the company has orders booked for the full capacity of the plant well ahead.

An export department has been organized under charge of Charles H. Meeker, and large orders have been booked for foreign countries for immediate shipment. C. T. Abbott has been elected as secretary of the company as a just recognition of his assistance in departmental reorganization. H. D. Snyder has been appointed assistant general sales manager. Mr. Snyder has had many years' experience in the service department of his former company and with this company and has received this appointment as a just reward for untiring efforts and faithful service. The company wishes to announce that at no previous time during its existence has the business been so prosperous or prospects so bright.

Architects Offer Expert Building Service to Automotive Dealers

New York, Dec. 17.—Mann & MacNeille, architects and construction engineers, have added to their organization an automotive department with headquarters in the Book building, Detroit. This department is designed to render expert building service to automobile dealers, garage men, repairmen and others engaged in retailing automotive merchandise, and is prepared to carry out work at any point in the country.

The aim of this new department is to cut the cost of construction and to increase the operating efficiency and sales pulling power of automotive buildings by improved design resulting from concentrated effort in this field. Its advent is due to recognition of the fact that a garage, show room or service station building is a specialized form of construction similar to a hotel or theatre and that detailed knowledge of the automobile business is primarily necessary if efficient buildings are to be developed for the trade. Harold F. Blanchard has been appointed as chief engineer of the new department.

Service Managers' Bureau to Be Feature of N.A.D.A.

PLANS TO BE CARRIED OUT EARLY IN 1920

St. Louis, Dec. 22.—A Service Managers' Bureau will be one of the new 1920 features of the National Automobile Dealers' Association if recommendations of the executive committee adopted at Cleveland December 6 are approved by the officers and directors of the association.

If the plan is adopted a service manager will be appointed whose business it will be to organize service managers throughout the country and bring their organizations into the N. A. D. A. as local bureaus. The manager of the N. A. D. A. department will be a high class service man, capable of devising cost plans, ratings and the various other details of service station management that now confront the service departments.

In connection with the development of factory service and the relation of the sealer to the manufacturer, the future meetings of the Service Managers' Bureau of the N. A. C. C. will be open to members of the National Automobile Dealers' Association who may desire to attend.

Gotham Truck Dealers Organize to Handle "Trade-in" Evil Problems

Plans were perfected recently for the organization of a central body by the large motor truck distributers of New York City to handle trade-ins through one medium and also for mutual protection and advantage to overcome many of the abuses now existing in the industry, which it is believed, through a closer relationship, can be materially minimized by friendly discussion which will prove beneficial in a high degree to all concerned. The following officers and directors have been elected: President, W. H. Moore, Garford Motor Truck Company; vice-president, A. G. Harrington, Packard Motor Car Company; secretary-treasurer, T. D. Pratt, Motor Truck Association of America, Inc.; directors, W. H. Moore, Garford Motor Truck Company; H. A. Smith, the Whiting Company; E. N. Stone, Manhattan Motors Corporation; C. G. Bond, Coulter & Bond; A. C. Harrington, Packard Motor Car Company; H. H. Skerrett, Republic Motor Truck Company; W. R. Couch, Couch-Haas Company; E. P. Herrmann, Herrmann Motor Truck Company; W. P. Held, Sterling Motor Truck Company.

It is hoped to make this movement one of the most progressive in the United States and its success will be followed with marked interest by the motor truck industry in the country.

State to Standardize Bodies

The Commission of Highways of the state of New York intends to devise a uniform type of body for all motor trucks throughout the state used in highway work. The commission itself will build these bodies, or they will be built on contract.

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Enlarged Highway Body Suggested to Congress

MISS. VALLEY ASSOCIATION TAKES ACTION

Washington, D. C., Dec. 18.—The Mississippi Valley Association in annual session here recently passed a resolution to congress, unanimously and without discussion, in line with the principles embodied in the Townsend bill now pending before the United States, looking to the enlargement of the Bureau of Public Roads into one of the most active branches of the federal government.

Specifically, the resolution states that, "based on information gathered in the states of the Mississippi Valley, the conclusion of your petitioners is that the Bureau of Public Roads should be enlarged into one of the most energetic and useful in the Department of Agriculture."

The association recommended further that the present Federal Aid System be undisturbed, which is also in line with Senator Townsend's measure, the only point of difference being that the measure now in the hands of the Senate Committee on Post Offices and Post Roads, and of which Senator Townsend is chairman, provides for a national highway system under federal construction and maintenance in addition to a continuation of the federal aid policy. It also recognizes not only the necessity for the enlargement of the Bureau of Public Roads, but provides that the federal administration be placed under a separate body whose sole function will be the study and administration of highway affairs, independent of any other branch of the government. It is pointed out that this plan is consistent with the precedent set by the Department of Agriculture in requiring the organization of State Highway Departments separate and distinct from the other branches of the state government before the state can participate in federal aid.

Clydesdale Company Tabulating Information to Establish Rates

Motor truck dealers the country over are becoming more impressed with the growth of motor truck freight routes. Concerns which, last spring, were operating one or two used trucks, are now branching out. They employ regular traffic managers, operate return load bureaus and have established fuel and repair stations of their own at both terminals of their routes.

In step with this movement the Clydesdale Motor Truck Company, of Clyde, Ohio, is tabulating information on which to base the freight rates of this new system of transportation.

As a basis it finds out the existing freight and express rates and the time taken by these companies for delivery. It also must determine the number of times that each shipment is handled by one of these older methods. The motor truck rate finally decided on must be lower than these rates, yet high enough to insure a reasonable profit.

Many factors enter into the computation, including the class of goods hauled, the motor truck speed, road grades, road conditions, most economical rate of speed for the motor truck, depreciation and interest. Another vexing question is the fixing of a charge per 100 pounds when the full capacity of the motor truck is not utilized.

In some communities goods can be hauled by motor truck at a much cheaper rate than by rail. In others the costs are about even, yet on the surface the same conditions appear to hold true in one case that do in the other.

Selden Sells 1400 Trucks

(*Continued from page* 17.)

London, and the result of his efforts is best evidenced by the fact that the deal was consummated through Gaston, Williams & Wigmore, who handle the Selden line in the European field."

The average price of a Selden motor truck is about $3000.00, which makes the total money involved in the contract in excess of $5,000,000. The Selden company has dealers throughout Scandinavia, France, South Africa, Japan, Central and South America, and only recently, in addition to the above order, over 365 Selden motor trucks were ordered to be delivered through its affiliations in Tokio, Japan and Vladivostok, Russia. As previously announced, the Selden company has already broken ground for a large extension to its present plant, and after the alterations and additions are made will have a yearly output equal to any other concern manufacturing motor trucks in this country.

Bates Is Booty President

E. A. Bates, a prominent figure in the carbureter world, has severad his connection with Benecke & Kropf to accept the management of the company manufacturing the new Booty carbureter. Rumors of this change have been circulating in trade circles for some time, and now the confirmation is made by the announcement of the Booty Carbureter & Manufacturing Company that its new president and general manager is E. A. Bates.

Henderson Is Promoted

The Martin-Parry Corporation announces the election of R. P. Henderson as vice-president and director of sales, with headquarters at Indianapolis. Mr. Henderson has been general sales manager of the Parry Manufacturing Company at Indianapolis for the past three years. Previous to that time he was actively identified with prominent automobile concerns in the central west.

Moves Plant and Office

The Traylor Engineering & Manufacturing Company announces the removal of the office and works of its motor truck and tractor division to Cornwells, Pennsylvania, which is about 18 miles north of Philadelphia.

N.A.D.A. Supports Campaign for Better Trade Schools

WILL NAME NATIONAL COMMITTEES

St. Louis, Dec. 22.—Better automobile trade schools will be the aim of the National Automobile Dealers' Association in 1920 as the result of the action of the executive committee of the association in Cleveland December 3.

The dealer association long has been cognizant of the need of better automobile mechanics. In the first place there is a dangerous shortage in the number of workers of all kinds and a particular scarcity of competent mechanics. It is the association's idea first to acquaint the young man about to start upon his professional training of the many opportunities offered by the automobile industry and to awaken in him and in those already in the shops the desire to become master craftsmen.

The tentative draft of the plan as prepared calls for an investigation of existing trade schools, the standardization of an automobile mechanics' training course and the development of new schools throughout the country which will be supervised generally by the dealers of the particular community, who thus will be in an excellent position to take the young men as they come from the schools and place them in positions where their qualifications will be known beforehand.

First steps in the plan will be the sending of a questionnaire to dealer associations in the larger cities asking the secretary of the local association to send to the national association a list of every automobile trade school in the vicinity. With this list as a start the association will take up directly with the school the investigation of its fitness to do its particular work. A committee on trade schools will be appointed in the national association and similar committees developed in the local.

Norma Company Moves Factory and Offices to Long Island City

On December 10 the Norma Company of America, manufacturers of "Norma" precision bearings, moved its factory from the Bronx, New York City, to Anable avenue, Long Island City, New York, where a modern four-story reinforced concrete building has been acquired. Under the new arrangement a largely increased factory space is secured, making possible the increased output of "Norma" bearings necessitated by the growing demand for these units. The new plant is being rapidly equipped with the special machines needed for manufacture, and the full capacity will be available shortly. The executive offices at 1790 Broadway have been consolidated with the factory at the new address.

G M C Promotes Rouze

C. F. Rouze, who has been assistant sales manager of the General Motors Truck Company, Pontiac, Michigan, has been promoted to the head of the new department of sales promotion. M. J. Kates has been appointed assistant sales manager.

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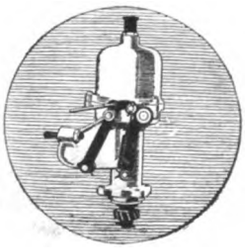
You Will Believe When You See It

Clydesdale is the only truck equipped with the "Driver Under the Hood", the automatic controller, and unless you know the Clydesdale you might be skeptical of the unusual claims we make for this wonderful little instrument.

But all we ask is that you get into the cab of a Clydesdale. Set the throttle for a speed of 20 miles an hour and, without touching the throttle again, steer the Clydesdale up a hill, down a hill, through mud and sand and notice that your speed never varies from 20 miles.

Then you will believe our claims of super-performance at minimum cost because you will see that the "Driver Under the Hood" regulates the flow of fuel for every changing road or load condition.

Test the Clydesdale against a group of good trucks and you will know why Clydesdale dealers are building such a permanent business.



No Other Truck Has It

"The Driver Under the Hood"

One to Five Tons Net Load

THE CLYDESDALE MOTOR TRUCK COMPANY, CLYDE, OHIO

CLYDESDALE

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POWER WAGON

An exponent of the most enlightened thought and practice of the motor truck industry.

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Motor Transport Laws

ADVERSE motor vehicle legislation has proved one of the most odious and irritating obstacles in the way of highway transport development, and there are but few indications that the immediate future holds any promise of change for the better. Viewed either as a fruitful means of producing revenue or as a very dangerous and destructive form of transportation, which must be checked at all costs and by any method, the motor vehicle has been the victim of more than its share of ill-advised and unjust regulation and restriction. And the trend of legislative thinking—if the process by which laws are evolved can be thus described—points toward even further limitation and penalization unless steps are taken to retard it.

We hope no one is so ill-natured as to attribute this state of affairs to a spirit of animosity toward the motor vehicle, although circumstances often warrant suspicions in that direction. Rather would we believe that the motor vehicle has not been properly represented to those who have its fate in their hands, that its function, particularly in business, is not well understood, and that it is too often treated as the demon of the highways instead of as the rapid, cheap and dependable transportation link between town and country. Lack of understanding results in lack of sympathy, and legislators may be pardoned if they seem to view with mistrust what has been so grossly misrepresented to them.

A very sensible and effective remedy of this evil seems to lie in a suggestion made by William M. Connelly at the recent convention of the Motor Truck Sales Managers' Association, and the plan, it appears to us, is worthy of examination. In discussing the first trailer law of Michigan, he remarked that such legislation could only be enacted with great difficulty if, before consideration by the legislature, it were submitted to a committee whose function was the suggestion, criticism and scrutiny of all proposed legislation affecting motor vehicles. Bills of that nature are now usually referred to committees which have little or no interest in advancing motor transport, and the result is the chaotic and backward situation everywhere apparent. Were they considered by sympathetic interests, many of their vicious and confiscatory elements could be eliminated before action by a poorly informed and none too friendly body of legislators.

The plan proposed naturally implies the provision at each state capital of a committee whose sole duties would be the functions named, yet which might quite properly consider also matters related to highway transport, which, as time passes, will come more and more to mean motor transport. Such bodies can be expected to accomplish a great deal in counteracting the efforts of the many state departments which deem it to their advantage to stifle motor vehicle progress. Thus, the department of finance finds the motor vehicle group a very lucrative field for emergency funds, the coroner and the insurance companies are unfortunately able to make, in the careless operation of motor vehicles, a very powerful plea for their drastic regulation, the public utilities commission is often too ready to consider the wails of the railroads which fear motor competition, and the highways department is always ready with suggestions for curtailing the use of motor trucks so that the moneys available for repairs and new construction can be distributed over a greater area and among a larger number of voters.

Such interests are very potent, financially and politically, and they are not likely to meet with much opposition as long as those interested in motor transport are content to trust their commercial future to the good sense and justice of rather indifferent legislators. A motor transport committee in every state legislature should prove a very effective means of combating the restrictive influence so actively at work, and their formation should not be long delayed.

A Census of Truck Use

NOTWITHSTANDING the feverish activity that characterizes the indefatigable census enumerator and the impressive array of questions to be found on the census inquiry blank, the published results, it is feared, do not arrest much attention outside schools and the private studies of research experts. Many business men are very skeptical of government statistics and well may they be. We have seen many questions answered, and we know something also of the methods of investigation, enumeration, compilation and publication. Yet, imperfect as the method is and imperfect as its execution may be, we should nevertheless wish to see something of the system introduced into the keeping of state motor vehicle records. In that event we should doubtless be able to learn how many vehicles of each type are in use in each district.

As matters now stand it is impossible to trace, by means of state statistics, more than about two-thirds of the country's motor trucks, to say nothing of its tractors, trailers, 'buses, and other highway transport media. Of our 48 states only 19 keep a separate count of passenger-cars and motor trucks, and in all but a few of the latter the record is so hopelessly garbled by inaccuracy and by false statements

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made by the registrants, that the results are no better than, and often not as good as, careful estimates made by those familiar with conditions. In 19 other states, inhabited by no less than 50,000,000 people and supported to the extent of at least $3,000,000 annually by the fees paid by motor truck owners, no official distinction is made between vehicles for pleasure and those for business. And, as for an enumeration based on load capacity, make, type, or class of service, it is practically unknown or, where in vogue, so inaccurate as to be utterly worthless.

Judging by what we hear in the way of questions regarding the vital statistics of this industry, there must be an enormous demand for reliable information concerning its extent and possible future growth. Such information is not now available, except for the estimates and incomplete data collected by individual investigators like ourselves, and unless a concerted effort is made to obtain it, we doubt if it ever will be. The task is a large one and is, in our opinion, a proper function of the state or federal authorities. We should like to see it made a part of the coming federal census, whose organization could bring to this problem the benefit of more than a hundred years of experience and all the advantages to be derived from the adoption of a single and complete method for the whole country. It is possibly not now too late to make this a regular feature of the government's quinquennial census-taking.

Highways and Railways

ALTHOUGH outward appearances present a hopeful outlook in the matter of transportation, we are privately informed from thoroughly reliable sources that the railway situation is far different from what most people believe it to be and certainly very far different from what it should be. No present crisis or transient emergency is responsible for the conditions that exist; everything is traceable to understandable causes, such as maladministration, high-pressure use unaccompanied by relatively high-pressure upkeep and replacement, shortage of rolling-stock and of labor. There is, therefore, no reason to expect that mere passage of time will bring order out of confusion or capacity out of incapacity. It is now perfectly clear that the railways are demonstrably inadequate to care for the present and rapidly growing transportation needs of our 105 millions of people spread out over an area of more than 3,000,000 square miles.

It is time that American manufacturers and the American public took stock of this country's transportation facilities. There is altogether too much blind confidence in the power of the railways to accomplish the impossible; there is too much reliance upon the railways as the sole transportation medium of the country. The railways should be given their proper value in relation to the other factors in production and distribution, since they are but a single element in transportation and not the framework and body of it. Transportation begins at the farms, the forests, the mines and the ports; it ends at the points of consumption or seaport transfer of goods. In the accomplishment of its herculean tasks the railways play a minor though important part. They serve merely as connecting links between centralized portions of the population. They do not originate transportation; neither do they complete it. They are fed and relieved by the millions of vehicles, horse-drawn and motor-propelled, which shuttle ceaselessly back and forth over our millions of miles of roadways, a tenth part of them improved, nine-tenths of them neglected.

If public opinion—and this includes that of those otherwise astute commercial interests, who are best able to remedy the situation but are content to appear most helpless—could only be taught to think rightly of transportation, we should not be obliged to acclaim the benefits of permanent and adequate highways from the crest of every available eminence. If transportation were viewed in its correct proportions, with highways as the base and railways as the apex of the pyramid, our fixed lines of carriage would not be the fetishes they are to-day. We would recognize the highway and the flexible highway vehicle as the very foundation of all transportation effort and as deserving of first attention and consideration.

And this problem is not without its labor dangers, fraught with alarming possibilities for the public. At a word the railways may be crippled, as indeed they have been in England, and it requires no vivid imagination to picture the misery that would follow such an event, particularly in winter, but with an adequate alternative the calamity might be averted. Lord Northcliffe's testimony is pertinent. Said he recently: "Labor . . . did not realize the power and potentialities of automobiles. They thought they would starve the community by stopping the railways. They discovered two things: that Great Britain is a country where every village is linked by roads that are the delight of all your tourists who come here, and that the motor truck is at least the equal in efficiency of the locomotive!" The superior in efficiency, we should say, and there is an abundance of evidence to substantiate the claim. Free from the restrictions of steel rails (which are costly, inflexible, and the special privilege of a single corporation), unhampered by the expense of costly termini and ponderous and complex organization, and able (like no other transportation medium) to carry its cargo from source to destination, the motor truck stands preëminent among transportation media, unrivaled in its sphere and a formidable rival of others outside it.

Transportation is too important a function of industry and too essential to the preservation of human life to be dallied with by a complacent and inept dependence on our common carriers as the mainstay of the system. Transportation is a national problem, a proper ward of national government; the highways on which it actually depends call for national attention, national support, and national supervision. Place highway-building in the forefront of national government obligations to the people and industry of the country; develop a sane and sufficiently complete national program for its advancement; acknowledge it to be what it really is—the most vitally necessary of all forms of national improvements; and feed it with every dollar that can be found actually or potentially available in the public purse. Only then can we be said to understand and appreciate the significance of transport, and only then shall we feel safe from the menace of railway collapse.

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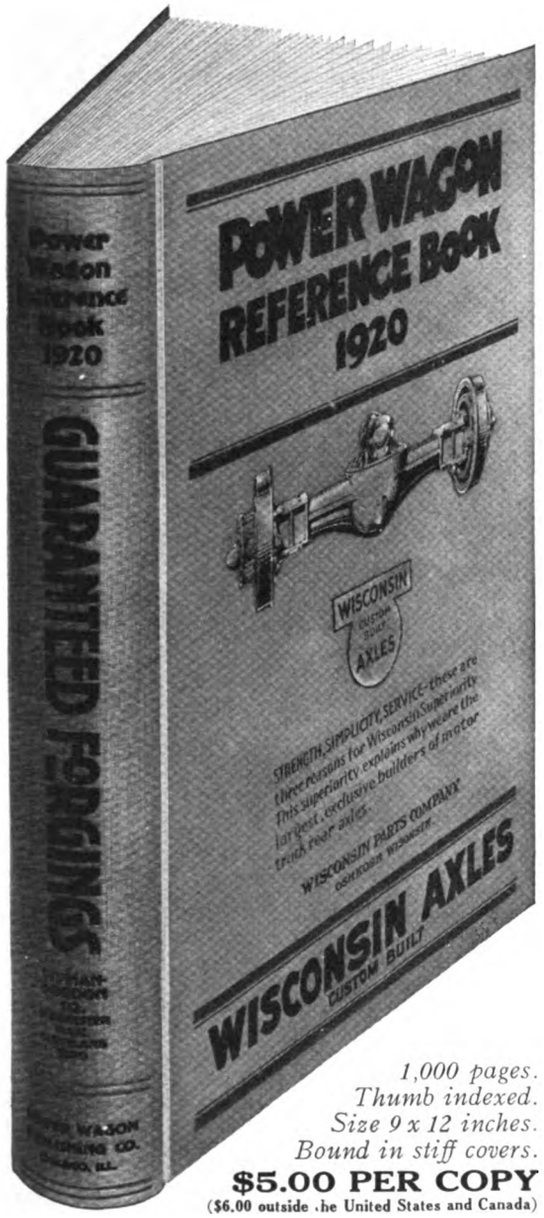

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Features of the Book

The 1920 edition of the "Reference Book" will contain 92 full pages (9x12 inches) of specifications of motor trucks, trailers, farm tractors and passenger cars. There will be approximately 134 pages of blue prints of these models, showing plan and elevation views. The 500 pages of text, in addition to the above, will afford a vast volume and great range of information to all who are interested in the production, sale or application of trucks, trailers and farm tractors.

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Conference Program Arranged

(*Continued from page 17.*)

of its varied phases, are being collected. Several are being secured from abroad.

The conference will open on the evening of January 3 in New York and the evening of January 24 in Chicago, with important inaugural sessions. Invitations to speak at these inaugural sessions have been extended to members of the President's cabinet, United States senators and governors of different states, and already several have accepted.

PROGRAM FOR HIGHWAY MOTOR CONFERENCE.

Friday, Jan. 9—
"Selling Motor Transportation."
"Handling Motor Trucks and Passenger Cars Together."
"Offering a Complete Transportation Line."

EVENINGS.

Monday, Jan. 5—
"Motor Vehicles in Passenger Transportation."
"Replacing Street Cars With Motor Buses."
"Motorbus Operation."

Tuesday, Jan. 6—
"Increasing Motor Haulage Efficiency."
"Cost Accounting, Routing and Dispatching."
"Loading and Unloading Devices."
"Incentive for Drivers and Helpers."

Wednesday, Jan. 7—
"Rural Motor Express."
"Its Opportunities As An Investment and Business Career."
"Its Advantages to the Shipper."
"Its Benefits to the Producer and Consumer."

Thursday, Jan. 8—
"Aids to Motor Truck Efficiency."
"Trailers."
"Pneumatic Tires."

Friday, Jan. 9—
"Motor Truck and Railroad Freighting."
"Cost, Range and Service Comparisons."
"Connecting Farms and Markets."

Saturday, Jan. 10—
"Highways and Motor Transport."
"Relation of Roads to Operating Cost."
"Progress in Highway Improvement."
"Constructing Roads for Motor Truck Traffic."

For Chicago as follows:

AFTERNOONS.

Monday, Jan. 26—
"Merchandising Motor Trucks."
"The Trade Segregation Plan."
"Effective Advertising."
"The Farm Field."

Tuesday, Jan. 27—
"Selling Motor Transportation."
"Handling Motor Trucks and Passenger Cars Together."
"Offering a Complete Transportation Line."

Wednesday, Jan. 28—
"Selling on the Firing Line."
"Proven Sales Plans."
"Developing Prospects."
"Promoting Rural Motor Express and Other Enterprises."

Thursday, Jan. 29—
(This session under direction National Highway Traffic Association.)
"Promotion of Highways and Traffic."
"Taking an Interest in Legislation."

Friday, Jan. 30—
"In the Matter of Service."
"The Truck Owners' Viewpoint."
"The Truck Dealers' Plan."
"The Manufacturers' Policy."

EVENINGS.

Monday, Jan. 26—
"Motor Truck and Railroad Freighting."
"Cost of Service Comparisons."
"Economic Range of the Motor Truck."

Tuesday, Jan. 27—
"The Farmers' Haulage Problems."
"The Horseless Farm."
"Connecting Farms and Markets."
"Farm Power."

Wednesday, Jan. 28—
"Rural Motor Express":
"Its Opportunities As An Investment and Business Career."
"Its Advantages to the Shipper."
"Its Benefits to the Producer and Consumer."

Thursday, Jan. 29—
"Highways and Motor Transport."
"Relation of Roads to Operating Cost."
"Progress in Highway Improvement."
"Constructing Roads for Motor Truck Traffic."

Friday, Jan. 30—
"Increasing Motor Haulage Efficiency."
"Cost Accounting, Routing and Dispatching."
"Loading and Unloading Devices."
"Incentives for Drivers and Helpers."

Saturday, Jan. 31—
"Aids to Motor Truck Efficiency."
"Trailers."
"Pneumatic Tires."

The program of the Highway Transport Conferences provides for an inaugural session on the opening night at both New York and Chicago, when the speakers will be men of national prominence, and the general subjects of highways and motor transportation will be discussed in a broad way, with special reference to the economics involved. During the remaining six days of each show, conference sessions will be held in the afternoon, primarily intended for those engaged in motor truck business, including manufacturing, distribution and service, and in the evenings, primarily for motor truck owners, operators and for shippers and any others interested in motor transportation. However, all sessions are open to the general public and everyone is cordially invited. On the closing day of each show there will be a single joint session in the afternoon.

There is a general title for each session and two or three subdivisions, each with its own subjects. For New York the subjects to be discussed are as follows:

AFTERNOONS.

Monday, Jan. 5—
"Merchandising Motor Trucks."
"The Trade Segregation Plan."
"Effective Advertising."
"The Farm Field."

Tuesday, Jan. 6—
"Smoothing the Path of the Motor Truck."
"Working for Highway Improvement."
"Taking An Interest in Legislation."
"The Automobile Legislative Council."

Wednesday, Jan. 7—
"Selling on the Firing Line."
"Proven Sales Plans."
"Developing Prospects."
"Promoting Rural Motor Express and Other Enterprises."

Thursday, Jan. 8—
"In the Matter of Service."
"The Truck Owners' Viewpoint."
"The Truck Dealers' Plan."
"The Manufacturers' Policy."

M. A. M. A. Sanctions More Shows Than Ever Before

PLACES O. K. ON FIVE BIG EXHIBITS

Arrangements have been made with the Kansas City Tractor Club whereby members of the Motor and Accessory Manufacturers' Association are to participate in the fifth annual tractor show to be held in Kansas City, February 16-21, inclusive, 1920.

In view of the great progress made in the tractor industry within the last few years, and the nation-wide interest evinced in the national tractor show, it was decided by the directors of the Motor and Accessory Manufacturers' Association to add this exhibition to the list of sanctioned shows. Applications and diagrams will be forwarded to members, and indications point to a large representative number of exhibitors.

The following are the shows sanctioned by the Motor and Accessory Manufacturers' Association:

New York (both passenger and motor truck shows), January 3-10.
Chicago (both passenger and motor truck shows), January 24-30.
Minneapolis—January 31-February 7.
Kansas City—February 16-21.
Boston—March 13-20.

This is the largest number of shows ever sanctioned by the association for any one year.

Applications for space already received for the New York, Chicago and Boston shows are exceeding all previous records, both in the number of exhibitors and the amount of space applied for. It is expected that this will also hold true of the Minneapolis and Kansas City shows.

Goodyear 1919 Sales $169,000,000; Promise $250,000,000 for 1920

The annual meeting of the Goodyear Tire & Rubber Company, held at the company's offices December 1, 1919, showed the past year's business the most successful in volume and profits of any year of the company's history. Gross sales for the fiscal year ending October 31 amounted to $168,914,982.83, an increase of $37,677,600.38 over the previous year. Net profits, subject to federal tax, were $23,277,245.29, as against $15,388,190.74 for the preceding year.

President F. A. Seiberling, in his report to the stockholders, said that during the year both issues of outstanding preferred stock had been called for redemption and the authorized common and preferred capital stock of the company increased to $100,000,000 each.

"We are looking forward to 1920 with a feeling of confidence and expect to be able to manufacture and distribute $250,000,000 worth of product during the year. The automobile, tire and accessory businesses are running along more smoothly than any other industry in the country, which means that our business will roll along in big volume for some time to come.

"We now have on our pay-roll 47,983 persons in our various world-wide activities, including employees at our branch offices, our California and Canadian factories, the cotton mills at Goodyear, Connecticut, the cotton plantation in Arizona and the rubber plantations in Sumatra. Of these, 28,681 are in Akron. Our production of pneumatic tires has now reached 33,000 daily."

Parade to Open Show

Arrangements are being made to hold the greatest motor truck parade on record the afternoon of Saturday, January 24, in Chicago. This is the date when the motor truck show will open at the International Amphitheater. F. T. Wright, chairman of the motor truck show parade committee, is working hard to make this a spectacular event, and he is receiving enthusiastic backing on all sides. So enormous will be the line of motor trucks that one parade probably will go through the Loop and three others will parade the south, west, and north sides respectively. Then all four will meet at some place outside the loop and form one mammoth procession.

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Merchant & Evans Co. Develops New Clutches and Universal Joints

Merchant & Evans Company, manufacturers of "Hele-Shaw" clutches, "M. & E." grease cups, etc., whose principal works, warehouses and offices are in Philadelphia, has designed and produced some new automotive devices.

The manufacturers claim that no really practicable and proved oil-retaining universal joint has thus far been successfully used in motor car or commercial motor vehicle practice, and to meet a very obvious demand for such a device, the "M. & E." oil-tight universal joint is now offered to the trade. Its great simplicity and strength are ideal and it embodies all of the best points worked out by automotive engineers for the war. The working parts consist of two hardened and accurately ground pins, the four ends of which are inserted in four hardened and ground bushings, which are driven into two tough steel drop forgings, a block being inserted between the yokes of these forgings for centering and supporting the pins. Very large bearing surfaces have been designed, so that the pressures per square inch shall be as small as possible. They are made in four sizes to fit all conditions of work. Samples of the "M. & E." oil-tight universal joints have been run 22,000,000 turns (30,000 our miles) at speeds of 40 to 200 r.p.m., under summer and winter temperatures. up to 15 degrees angle without change or loss of oil or injury to packing. The inside leather sleeve is what holds the oil within the housing.

This company reports another development in its new "M. & E." dry disk clutches, which are made in two sizes, known as Models 10 and 12. These clutches are of the unit power plant type and will go into any open flywheel that motor manufacturers supply and are constructed to fit standard types of S. A. E. bell housings. Very light main spring pressure is multiplied by three levers and produces strong spring pressure on the disks. The friction surfaces are very large, which adds to the life of the clutch. Adjustment is very simple, easily understood and is made by a unique arrangement of steps on the cover plate.

Merchant & Evans Company has plants in Philadelphia, Warwood, West Virginia, and Chicago, with offices and warehouses in Philadelphia, New York, Baltimore, Atlanta, Cleveland, Chicago, St. Louis and Kansas City, but the increased demand for its products has necessitated opening a new branch office in Detroit, with an experienced sales engineer in charge of the mechanical department. Another sales engineer is in charge of the mechanical department of the Chicago office, but the principal engineering staff and headquarters of the company are in Philadelphia.

Parker Joins Packard

Austin Parker, of New York, has joined the advertising staff of the Packard Motor Car Company as director of publicity. Mr. Parker was in Europe for the New York Tribune in the first year of the war and later served with the Lafayette and the American flying corps.

Cincinnati Stages Four Motor Truck Runs

Queen City Boosts Power Wagon Haulage with Customary Spirit That Knows No Defeat

MONDAY, December 8, was a red letter day in Cincinnati motor truck circles, it being the occasion of the Tri-State Motor Truck Run, which has served to give the ship-by-truck idea a wonderful impetus in the Queen City and surrounding territory. This was the first big demonstration of the kind ever staged in this section, and results have proved that it has been a great factor in the advancement of motor truck transportation. The demonstration opened with a parade through the principal streets of Cincinnati of 80 motor trucks of different makes, followed by a run of four distinct trains to points in Indiana, Kentucky and Ohio. The motor trucks all were heavily loaded with freight destined for points along the various routes, which had been furnished by local manufacturers and merchants, consigned to customers in about twenty cities and towns. Besides the local interest which was very great, enthusiasm among business men along the routes taken was encouraging, it being the general rule that the trains of motor trucks were met by delegations of representatives from business organizations in all the towns visited, often including brass bands and officials, who welcomed the visitors in a way to warm the heart. The run was made under the joint auspices of the Cincinnati Motor Truck Operators' Association and the Cincinnati Motor Truck Dealers' Association, and was endorsed by the Chamber of Commerce, Business Men's Club, and other influential business organizations, all of whom realize the importance of this new movement for the quick and economical transportation of freight.

The committee in charge of the demonstration was as follows: J. P. Patterson, chairman; Albert Staab, William Kilduff, Chas. Ratterman, S. Hickey, Jos. S. Steltenpohl, H. H. Southgate, E. L. Scott, L. A. Woodward and H. P. Kelly. Route No. 1 was from Cincinnati to Dayton, Ohio, via Franklin, Sharon and Reading; Route No. 2, Hamilton and Middletown, via College Hill; Route No. 3 to Lawrenceburg, Indiana, via Harrison, Aurora and Rising Sun; Route No. 4 to Covington, Newport, Walton, Erlanger and Independence, Kentucky.

Commodities of all sorts were carried on the runs, including coal, lumber, musical instruments, furniture, wall paper, meats and groceries, as well as other articles too numerous to mention. The number of motor trucks in the run was limited owing to the ruling that only one machine of any make could be included in each train. The merchandise hauled was furnished by the members of the Merchants' and Manufacturers' Association of the Cincinnati Chamber of Commerce, and no charge was made for transportation, the motor truck men shouldering the expense simply for the advertising value of the demonstration.

Train No. 1 was in charge of E. L. Scott, and upon arriving at Dayton, Ohio, was met by a delegation of prominent citizens from the Dayton Chamber of Commerce, the Rotary Club, the National Cash Register Company and other organizations, who accompanied the train into the city. The machines were parked, after delivering their freight, in Library Park, where speeches were made by prominent men both from Cincinnati and Dayton. Train No. 2, in charge of Harry P. Kelly; Train No. 3, in charge of Albert Staab, and Train No. 4, with L. A. Woodward in command, met with similar demonstrations of enthusiasm and all the fleet commanders are sure that permanent good will result from the run. Already word comes from Lexington, Kentucky, that motor truck dealers there, impressed by the action of the Cincinnati men, have formed an organization under the name of the Central Kentucky Truck Dealers' Association, of which W. R. Williams is president; Fred G. Bryant, vice president, and W. L. Morris, secretary-treasurer. That similar action will be taken by motor truck dealers in other cities in this territory seems to be assured.

The rather surprising announcement is made that there are 43 motor delivery companies operating over 27 distinct routes on a regular schedule. These routes vary in length from 18 miles for the round trip to 210 miles. In addition to these regular routes and transportation companies there are more than 70 other motor truck concerns hauling freight anywhere at any time. That this number will be greatly increased through the activities of the new association recently organized is a foregone conclusion, and motor truck men of Cincinnati and vicinity feel certain that their business is in for a wonderful expansion.

Nash Joins Beaver Colony

W. H. Nash, formerly in the sales department of the Timken-Detroit Axle Company at Detroit, has accepted the position of sales manager with the Beaver Manufacturing Company at Milwaukee, Wisconsin, manufacturers of a 4-cylinder tractor engine and a 6-cylinder passenger car engine. Mr. Nash enters this broader field with a thorough knowledge of the automotive industry gained during his experience with the Timken company. Mr. Nash in taking up his new duties with the Beaver company will institute a number of new policies which doubtless will be a deciding factor in the automobile engine business of the future.

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Goodyear Introduces 6-Wheel Truck to Engineers

S. A. E. DIVISIONS ENTERTAINED AT AKRON

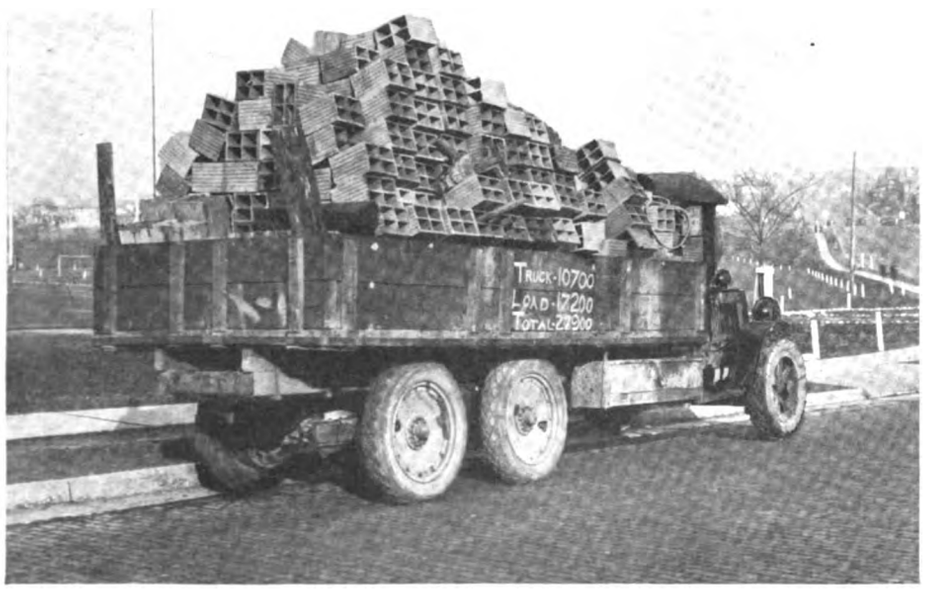
More than 200 members of the Detroit and Cleveland sections of the Society of Automotive Engineers held a splendid two-day session at Akron, Ohio, on December 1 and 2, as the guests of The Goodyear Tire & Rubber Company. Great enthusiasm was shown over the fine program arranged for their visit and, when the special railroad cars and automobiles left for the return trips, the engineers were lavish in their praise for the way in which they had been entertained.

The meeting was held for the purpose of presenting technical information pertaining to the application of pneumatic tires to motor trucks, the Goodyear experts having obtained many data in the company's development of motor trucks and tires.

The visitors witnessed a demonstration of a new development in motor truck design—the tandem axle construction—Goodyear's contribution to the motor truck industry. The "six-wheeled" machine, having four wheels in the rear, was driven over roads of various conditions, and the results proved a pleasing surprise to the designers.

Monday evening the engineers were guests at a banquet at which F. A. Seiberling, president of the company, and P. W. Litchfield, factory manager, made far-sighted predictions as to the future of the motor truck industry. Mr. Seiberling declared that within three years the solid tire would be obsolete and that the fabric would soon pass, but that the pneumatic cord was the ultimate tire. He asserted that in a few years there would not be a highway in the country of less than 18-foot width and the highways would be of solid foundation to counteract wear and speed by motor trucks. He also prophesied that China would be a great market for motor trucks.

Mr. Litchfield stated that the trolley car must go as a means of transportation—to be succeeded by the motor 'bus. Street traffic conditions are such that the entire width of thoroughfares must be used and traffic must be continuous, with the use of motor vehicles that can go to the curb to take on and discharge loads without holding up other traffic. He said the motor 'bus was the logical means of city development as it did not need the investment of money for franchises and equipment. If trolleys must remain, they must go underground as in London. Mr. Litchfield also predicted that the multiple-wheel motor truck along lines of the one developed by Goodyear, would be a serious competitor of the freight car on long hauls because of its mobility.



Goodyear experimental 6-wheel motor truck.

Bay State A. A. Plans to Increase Powers in Framing Motor Laws

The officers of the Bay State A. A. recognize that the motor industry will be singled out for extra taxation next year, and so it has begun its plans to fight now. It has secured a man as executive secretary who will devote the greater part of his time to getting out literature for the members, preaching the gospel of co-operation, securing new members, etc. His name is Paul Amundson. He is an attorney, and a Harvard man.

The board of governors has had several meetings recently completing plans for the new drive to enlarge the membership. It calls attention to the fact that the club officials aided in preventing the surtax plan from going through, which was a saving of $1,500,000 to Massachusetts motorists last year.

Also that through its efforts a start was made whereby Boston sent a committee to Washington a couple of years ago to head off a tax which would have been passed on to motorists all over the country, amounting to millions. Other cities sent letters and telegrams. Boston sent the men who had the punch in their arguments, as events proved, for the hearings had been closed on the measure, but was reopened, and the bill killed.

The organization was behind the opposition to the tripling of the fees on motor vehicles this year, which would mean owners paying from $15 to $75 for registration fees instead of $5 to $25, as at present. That would mean paying over $7,500,000 to the state this season, instead of the $2,500,000 the motorists have contributed.

Whenever inimical laws were being considered the voice of the club was heard, and this has covered a period of years. Now its executives feel that it is time that some spirit of consideration should be shown for all its efforts and to continue the good work. Therefore it appeals for new members.

Eaton Axle Company Organizes to Operate Large Cleveland Factory.

A new Cleveland company, organized by a group of strong and well-known financial interests and incorporated under Ohio laws with approximate capital of $5,000,000, as the Eaton Axle Company, will have its first factory unit completed soon and will be marketing its product by June, 1920. All the stock has been sold.

V. V. Torbensen, inventor of the Torbensen axle and one of the founders of the Torbensen Axle Company, is chief engineer of the Eaton Axle Company, and J. C. Eaton, formerly president of the Torbensen Axle Company, is president and general manager of the new concern.

Following inventions of Mr. Torbensen of a decade ago the two founded the Torbensen Axle Company, which started production in a small shop in New Jersey. Subsequently the industry was moved to Cleveland, where it grew rapidly and is today conducted on a gigantic scale. With the Eaton Axle Company here Cleveland will be supplying the bulk of axles to the automobile industry. The products of the new company will be based on new inventions by Mr. Torbensen which eliminate, it is declared, many of the outstanding objections to pleasure car and motor truck axles of the past.

The Eaton company, according to Mr. Eaton, will manufacture two distinct types of axle—a conventional passenger car axle of beveled gear type and a motor truck axle of internal gear type, with all gears operating in oil.

During the first year of operation the new company will produce 200 sets of passenger car axles and 100 sets of motor truck axles per day. Contracts for the first year's product have already been made. As rapidly as possible the plant will be enlarged.

The Eaton Axle Company will be represented at the New York Show by Torbenson, Eaton and Hill with headquarters at Hotel Vanderbilt.

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Comparing Work and Cost of Trucks

A Discussion of the Unit, Which Will Become the Universal Basis for Trucking Rates and the Selection for Efficient Work of Motor or Horse Trucking Vehicles—the Unit-Mile

By S. S. MERITHEW

EVEN in transportation, comparison is the proving ground of all values. The right picture of different values, however, will never be obtained, at least in transportation, until the comparison is based on tabulated experience. Large manufacturing concerns employ the service of expert public accountants to verify the findings of its own auditors, but most of all to secure an unbiased, intelligent analysis of its financial affairs.

In the hurried development of the new transportation system motor truck service, this intelligent analysis has often been overlooked. This oversight was due in part to the fact that the majority of business was conducted and most decisions were made without tabulated experience. Experience they had a plenty, but it was tabulated in the bankruptcy court instead of before.

As the public accountant must have accurate facts on which to base an intelligent analysis so the business man must have facts on which to conduct a successful business. To-day when there must be careful distinction between different types of transportation units, i. e., the gasolene truck, electric truck, the horse, etc., each of which has an efficient field of activity, business employing these units must base its decision on facts, fundamentally right, accurately kept, and intelligently analyzed.

WITHOUT such facts few organizations, however good, are in a position to select transportation equipment that could prove efficient. If by chance they selected the right equipment they could seldom operate it efficiently. But let there be no misunderstanding—record facts may be fundamentally right and accurately kept, but still fail to serve business wisely for the lack of an intelligent analysis. It is this analysis that must be studied and one phase of it will be considered here.

Two engines entirely different may each be very efficient if given the right work. A comparison of their work ability is readily determined by knowing their horse-power. A similar comparison of the work ability of two motor trucks or two teams will result from their relative unit-mile performance. Comparing engines entirely by their relative revolutions per minute would mean little and in the same way comparing motor trucks by their relative daily mileage is no sound basis. But a horse-power represents a definite measurable amount of work performed by an engine and the unit-mile represents a measurable value of work for a transportation unit.

Defined, a unit-mile is the carrying of one unit of load a distance of one mile. This unit may be packages, pieces, thousand feet, cubic yards or tons, etc. It is most often spoken of as applied to tons, but is as readily applied to the other units. Throughout the remainder of this discussion the term "ton-mile" will be used to show the application of any unit-mile in the comparative analysis of transportation problems. The term ton-mile has been in use for some time, but since it is destined to play so important a part in future transportation, its use can not be too well understood.

The definition is so clear that the possible performance of a hauling unit in any period of time is easily determined when its capacity and the mileage for that period are known. Suppose it is a 1-ton motor truck and has traveled 5 miles, then the definition says that with its rated load it would have performed 5 ton-miles. If it had been a 2-ton motor truck with capacity load it would have performed 12 ton-mile, since each of the 2 tons have been carried 6 miles. In this last instance the load capacity in tons was multiplied by the distance the motor truck moved. This method will always give the work capacity of a hauling vehicle when not overloaded.

UNFORTUNATELY for the efficiency of transportation, this work capacity is seldom attained. Like the 60 horse-power of your passenger car, it is available, but seldom used. The 2-ton machine may carry its rated load from A to B, a distance of 3 miles, but from B to A it runs empty much of the time, and for this reason return load bureaus are being established in all of our large cities. Nearly one-half the work capacity of motor trucks and teams is going to waste every day. An analysis of motor truck hauling during February, March and April of 1919 shows the average power wagon as 57 per centum efficient from a work capacity standpoint.

To gain the right picture of a motor truck's work, this work must appear in the right relation to what the motor truck could have done. The 2-ton load moved 3 miles equals 6 ton-miles, but when the motor truck returns empty 3 miles it performs *no* ton-miles, for 3 times 0 can not equal ton-miles. Unfortunately, in the past this fact has often been missed, with the result that many showed the motor truck as doing its maximum work in ton-miles whether it did or not. The effect of such a practice on ton-mile cost is apparent.

With a coal truck it is a simple matter to determine the actual ton-miles of work performed. Each load in tons multiplied by the miles the load was actually carried will give the ton-miles for that load. Suppose the load was 3 tons and it was delivered to a house 2 miles from the yard. The ton-miles performed would be 6, regardless of the size of the motor truck doing the work. While the motor truck is returning empty to the coal yard it is producing no ton-miles.

But for the day, month, year or, in fact, any period there is an easier way which is equally accurate. Multiplying the tonnage for the period by one-half the average trip distance during the period will get the answer.

SUGGESTED DAY'S WORK.

Trip.	Load. Tons.	Miles Carried.	Miles Run.	Ton-Miles.
1.....	2	3	6	6
2.....	3	4	8	12
3.....	3	2	4	6
4.....	2	3	6	6
Total....	10	12	24	30
Av. per trip ..		..	6	..

By definition: Total tonnage (10) times one-half average trip distance (3) equals ton-miles (30).

IN the coal example the answer is the exact picture of the work performed and has therefore been called the absolute ton-mile, since the result is a literal interpretation of the definition. In the wholesale grocery business, for example, it is not so easy to determine the exact distance any part of the load is carried without a tremendous amount of work, and since any method of measuring work must be practical first, it has seemed wise to sacrifice, when necessary, a little accuracy to secure a practical result.

The definition already quoted is therefore used almost universally at present to secure the ton-miles in any line of motor truck work, since the error, when any exists, is of little or no consequence. Some have thought that because a motor truck carried loads in both directions it would be necessary to omit dividing the trip distance by 2. This, however, is not so, for the entire tonnage for the trip is not carried the entire trip mileage, for example:

> Three tons carried to B, 5 miles, makes 15 ton-miles, and 3 tons carried from B to the starting point equals 15 ton-miles. Six (6) tons have been carried on the trip which covered 10 miles and resulted in 30 ton-miles of work.

Omitting the 2, the result would be 6 (tons) times 10 (miles) equal 60 ton-miles, or twice the actual result.

Is It Possible

for a 5-ton motor truck to produce a ton-mile cost of $0.01?

Suppose we thought it could and wanted to prove it.

Suppose the motor truck ran 100 miles daily fully loaded, then each of the 5 tons would move 100 miles and the work performed would be 500 ton-miles.

The ton-miles multiplied by the cost per ton-mile should give the cost of the 100-mile run.

500 times $0.01 = $5.00.

It is impossible today!

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Following the rule, 6 (tons) times (one-half trip mileage) 5 equals 30, the correct answer.

Having produced a method which results in actual, not inflated, ton-miles, it is safe to determine the cost. This can be found by dividing the cost for any period by the ton-miles produced in that period. But intelligent analysis must go farther than this to-day when state commissions are beginning to establish ton-mile rates on motor truck hauling.

The cost per ton-mile is a variable factor, for, other things being equal, it decreases as the capacity of the motor truck increases. What may be a perfectly fair ton-mile rate for a 5-ton machine with capacity load would bankrupt a 2-ton motor truck with its capacity load. To prove this, assume that both motor trucks operate 60 miles daily. The operating cost of the 5-ton machine might easily be $24, while under like conditions the operating cost of the 2-ton would equal about $16. Assuming that half the milage in each case is without load, the 5-ton motor truck would accomplish 150 ton-miles while the 2-ton accomplished 60 ton-miles. The ton-mile cost for the 5-ton would then equal $0.16, as compared to $0.26 for the 2-ton.

Ask the 2-ton to work for the 5-ton rate and its daily permissible expense (for profit has been omitted in this discussion) will be but $9.60, a daily loss of over $6.

When will we wake to the realization that facts must control business and that rates in motor trucking must be established for the load provided, which determines the vehicle, instead of on the ideal, large-load, seldom-attained basis? Is it any wonder that but 12 per centum of motor trucks in general hauling during 1918 actually made any money?

In closing this discussion it is well to make plain the advantage of the larger vehicle efficiently used. The advantage exists because one 5-ton motor truck does not cost twice as much as one 2½-ton motor truck either to purchase or to operate, and therefore the ton-mile cost of operation on it is bound to be lower.

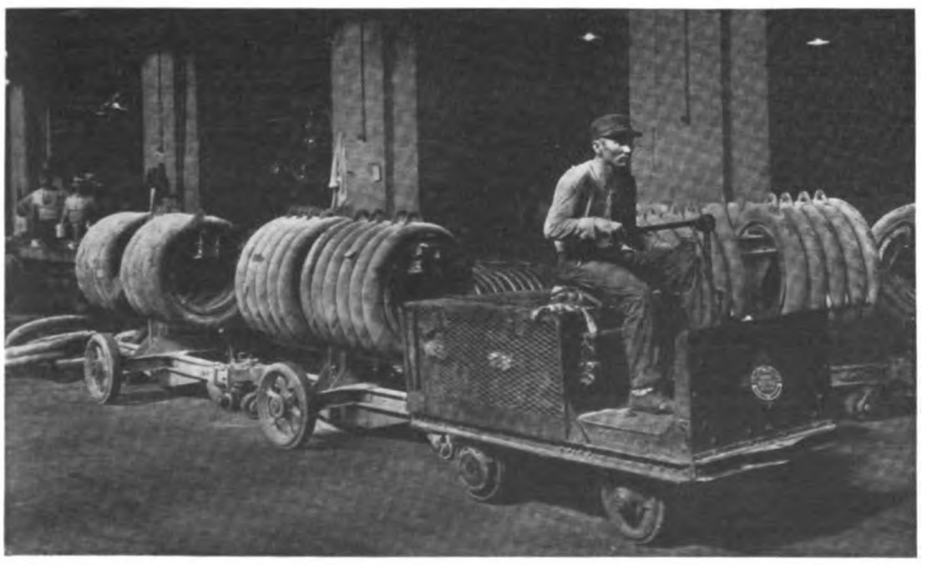
Queen City Truck Dealers Organize Association

HAS BACKING OF ALL CIVIC BODIES

Cincinnati, December 10, 1919.—The Cincinnati Truck Dealers' Association is the newest organization of men interested in advancing the "ship by truck" idea, and judging from the sort of men who are behind this organization, it will be a substantial factor in the industry. There had been more or less desultory talk of such an organization for some time, the movement received its first real impetus about the early part of November, when the local representatives of the Firestone Tire and Rubber Company, J. P. Patterson, suggested to a number of live motor truck dealers that he believed the time was opportune for the local men to get behind this national movement and form an organization which would be a credit to the industry. Twelve of these men attended a meeting arranged for by Mr. Patterson, and the decision was made to send invitations to all the local motor truck men to attend a meeting for the purpose of forming a permanent organization. Immediately the idea received ready and enthusiastic response. At the organization meeting more than a score of the leading motor truck dealers were represented, and the following officers were elected: President, Charles Ratterman; vice president, W. M. Kilduff; secretary, E. L. Scott; treasurer, Harry P. Kelly. The enthusiasm of the members of the new association has been rewarded by offers of coöperation received from various influential business organizations of Cincinnati and vicinity. Among these are the Chamber of Commerce, the Business Men's Club and the Cincinnati Rotary Club.

The Truck Owners' Association, also recently was organized; also the Cincinnati M. & M. Package and Freight Bureau, an organization of business men in all lines interested in the prompt and efficient forwarding of freight. It would seem that Cincinnati is now to take a prominent place in the ship-by-truck movement. The new association has furnished plans very broad in their scope, and it is certain to become a factor in transportation matters in the Queen City. The first action taken by the association was the decision to get behind the Tri-State Ship-by-Truck Run, which has been organized with Mr. Patterson as chairman of the committee in charge. This tour immediately engrossed the attention of the association to the exclusion of other affairs. A report of this run, which included four distinct trains from Cincinnati to points in Ohio, Indiana and Kentucky, will be found in another column of this issue.

Following is a list of the members enrolled to date: Gary Motor Sales Company, Southern States Motor Corporation, O. Armleder Company, Harold Motor Car Company, H & T Auto Company, Citizens Motor Car Company, Ratterman Car Company, Mason Towle Company, U. S. Motor Sales ompany, Herschede Motor Car Company, Nash Cincinnati Motors Company, Service Truck Company, The Trailmobile Company, White Motor Car Company, F & U Motor Company, Schacht Motor Truck Company, Cunningham-Holmes Company, Republic Truck Company and the Hanauer Auto Sales Company.



This machine has hauled 20,000,000 pounds of tires.

Factory Truck Runs 180,000 Miles; Carries 20,000,000 Pounds of Tires

Accompanying is a picture of the first electric factory truck ever operated at Goodyear, and its driver, John Somody. For six years this industrial truck has been operated in Department 150B and has traveled approximately 180,000 miles. Somody has driven it more than 75,000 miles. The machine hauls a load of 3,100 pounds each trip, making a trip once every four minutes about the department. In one eight-hour shift it pulls over 200,000 pounds of tires and cores, doing the work that it formerly took 25 men to do. In all, there are 25 such machines at Goodyear. The three types used are the self-loader, the tractor and the flat freight.

The power used to run these electric trucks is supplied by two large storage batteries. It is necessary to make a change of batteries every eight hours. The tires used on the machines run on an average of 40,000 miles before they are unfit for use.

Union Factory Enlarges

The Union motor truck factory at Bay City, Michigan, is being enlarged. A new building 200 by 750 feet, with two wings each 150 by 400 feet, running from the main buiding, is under construction. This additoinal space will allow the building of 15 complete trucks a day. The demand for Union motor trucks the last six months has made this building program necessary.

Acason Cops Bacon

Announcement of the appointment of F. S. Bacon as southwestern district sales manager for the Acason Motor Truck Company is announced. Mr. Bacon will make his headquarters at Fort Worth, Texas.

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Fuel and Building Supplies Delivery

Nature of Materials to Be Hauled Must Be Carefully Considered in Successful Operation of Motor Trucks as Units in Transportation

IN considering a transportation system it is always well to consider first the nature and character of the business which it serves. The delivery of milk or farm produce varies greatly from the delivery of coal and building supplies and the transportation system must be varied accordingly.

The United Fuel & Supply Company, of Detroit, deals in coal and coke, building, paving and sewer supplies. It operates twelve yards or distribution centers, six of which are located along the Detroit river front and are supplied by both water and rail. The other six are located about the city and are supplied by rail alone. As the company operates its own dredges and barges, it follows naturally that the six yards along the water front would handle the majority of the sand and gravel. However, the company also operates sand and gravel pits about thirty miles from the city and these pits keep the inland yards well supplied for smaller orders. So the transportation problem of the company is to haul the fuel or supplies to the various jobs or private consumers with sufficient rapidity to prevent the overstocking of the bins and consequent double handling of the supplies. In order to meet these requirements both horse-drawn drays and motor trucks are used.

THE reasons for this division of labor are manifold. The majority of the coal orders and quite a few of the building supplies orders are small and because of the zone or district system of delivery are close to the yard or shipping point. It is an established fact that the motor truck can not operate economically as yet on orders for parts of full loads which involve frequent stops and hoisting of the dump body. So the company has found it best to operate teams with dump type wagons for short hauls and small order deliveries and motor trucks for the steady hauling to large jobs or for long hauls to small jobs. The teams, however, are operated from the yards under the yard management and need not be considered in connection with the system of motor transportation.

The motor service department has its offices in the central garage, which is a one-story brick building 104 feet by 280 feet, located centrally with reference to the yards. It occupies one end of a city block and has two entrances on one of the main thoroughfares and two exits on another, which tends to avoid traffic congestion at the doorways. The motor trucks are parked in a perpendicular manner against the side walls which are provided with 12-foot ledges to act as bumpers for the rear wheels of the motor trucks and prevent contact with the walls when backing into position. Fourth-inch ditches have been constructed at the base of these ledges to the floors. The offices occupy one corner provide for oil and moisture drainage from of the building with a porters' room and stock room opposite and at the other end a machine shop is so situated that an entrance is obtained from the street through which motor trucks slated for heavy repairs may be driven. Near the office a battery room and employees' washroom are provided.

The company operates 58 motor trucks, of which 40 are Packard and Pierce-Arrow 5- and 6-ton chassis equipped with tipping bodies; 14 are equipped with stake bodies; 2 Packard 2-ton stake bodies which are used for pick-up work about the yards; 1 Commerce and 1 Ford 1-ton used by the commissary department for the supplying of food and other necessities to the barges, tugs and dredges. Three service cars equipped with spare parts, jacks, block and tackle are available to care for small trouble on the road.

THE operation of the fleet is vested in a superintendent, his assistant, a dispatch man and one clerk. The cost sheets are kept at the main office under the supervision of the auditing department and are made up from data submitted from the office of the department. Recapitulations are made from these sheets and filed at the office for the reference of the superintendent and his assistants.

The dispatching system is one of the prides of the company. At a stated time each afternoon the various yards are expected to receive their orders from the order board at the main office. With these orders to be filled and delivered the next day the yard manager makes an estimate of the number of tipping or stake body machines needed to care for these deliveries and phones his requirements to the motor service office. These requirements are compiled by the dispatch clerk and in case they are in excess of the number of motor trucks available the general superintendent is consulted and preference given as he directs. This done, the dispatch clerk fills out a printed form showing opposite the number of each motor trucks the driver for the next day (which is permanent whenever possible), the yard to which the motor truck is assigned for the day and the yard at which the motor truck is to stop first, if any, and pick up a load for his final destination.

On a large raised blackboard near one of the entrances of the garage is a reproduction of this form and on it the dispatch clerk writes in the assignments as compiled on the form, and any other notices which may affect the drivers as a body. The men as they come in at night glance at the dispatch board and read their assignments for the next day, so that in the morning they can go directly to their respective machines and without loss of time get them out on the road.

Once the motor trucks have left the garage, they are considered to be in the employ of the yard from which they are working and the yard manager executes operating authority over them. As the motor trucks come into the yard through the checking gate they get their loading orders without stopping and proceed directly to the bin or warehouse in which the commodity to be loaded is located. Tipping body motor trucks hauling sand or gravel or coal drive under overhead bins from which chutes are so arranged that they can be operated if necessary without the driver leaving his seat. The chutes are opened and closed by levers which can be reached from the driver's seat. Once his machine is loaded he pulls it a few feet away from the bin to permit access to it by another motor truck and with a shovel levels his load off even with the sideboards to insure even riding strains upon the chassis and later, in unloading, upon the hoist. The load leveled, he drives past the checking window, picks up his receipt form and is on his way. The time consumed in loading averages from eight to ten minutes, but under ideal conditions can be done in three minutes, including all of the above operations.

Stake body motor trucks are not so simply nor so easily loaded. These are provided with two helpers, who ride with the driver and assist him in loading and unloading. The stake bodies are generally loaded directly from the car or warehouse, by hand, and unloaded at the job in the same manner, whereas, the tipping bodies are, of course, equipped with hydraulic hoists operated from the driver's seat.

BEFORE the driver leaves the garage in the morning he inserts in a metal folder provided for the purpose a cardboard form called a truck record card. On this card is kept a record of each trip, the destination, the commodity carried, with its weight, and receipt identifications and any lay time that may occur on the trip due to traffic congestion, mechanical defects in the motor truck mechanism, etc. The mileage registered on the odometer upon leaving and arriving at the garage and the number of hours of motor truck time to be charged to the various yards is also recorded. These cards are turned in at the office upon completion of the day's work and with the oil and gas record form the basis for the computation of motor truck costs as well as providing an effective check upon the efficiency of the driver. Each card is carefully checked by the dispatch clerk and notations made of the number of trips, mileage and total tons carried during the day before the cards are forwarded to the auditing department.

As a rule the company expects the driver to make only the slightest of repairs upon his machine, leaving all except the

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minor adjustments and repairs to the maintenance department. Accordingly, if repairs are necessitated while the motor truck is on the road the driver phones into the garage explaining the nature of the defect in detail and his exact location with regard to street intersections. If the defect is such that it can be cared for by one of the service cars, one of these is dispatched with the necessary replacement parts; otherwise the driver is instructed to return his machine to the garage for repairs by the maintenance department. This latter is done only in exceptional cases, for the time lost in trips to and from the garage is not to be discounted.

Drivers are instructed to rely absolutely upon their own judgment where a case of pulling a motor truck in over a stretch of bad road in order to reach the job is involved and generally their judgment proves excellent. Mistakes are made, however, and when a motor truck becomes too deeply mired to extricate itself a service car equipped with block and tackle is sent to do the job.

Careful attention is given to maintenance and repairs. A night and day shift of mechanics under competent supervision is at work constantly in an effort to keep the motor trucks in repair and on the road. The matter of equipment for this work is carefully studied and an attempt to supply every need is made. The stock room is kept well supplied with all replacement parts and at intervals during the slack season complete motor trucks are assembled from the parts available.

THE machine shop includes drill press, 30-inch lathe power saw, hand press and air compressor. The battery room is equipped with charging and testing apparatus for both batteries and magnetos as well as replacement plates and separators for rebuilding. The drivers are expected to act as their own inspectors and be constantly on the lookout for minor defects, rattles, squeaks or faulty adjustments. Upon reporting back to the garage at night he fills out a driver's defect report, showing the nature of the defect with the driver's name and motor truck number. The night foreman plans his work from these cards, attending to the minor jobs first, and if necessary, holding the larger jobs over for the day shift. The amount of work by the mechanics, with the quantity of material used in making the repairs, is noted on a form called the repairs orders card, from which costs for labor and materials used in the repair is computed and charged against the motor truck by the auditing department. Costs are computed from data submitted on three forms, the Driver's Truck Record, the Repairs Orders Card and a form showing disbursements of gasolene and oil for each motor truck. The night shift attends to the doping and gassing so that every machine receives this attention every other night and quantities of gas and oil used are entered on the form and charged against the motor truck.

These three forms go to the auditing department and from them cost records somewhat similar to the forms recommended by the National Truck Owners' Conference are kept. The first form is a daily record of each motor truck and covers a period of one month. In the first section of the form the number of trips, the number of delivery or pick-up stops and the total tons carried with the mileage is entered. In the second section comes the time as expended during the day, including time available but not used, time consumed in loading and unloading, running time, including stops for traffic congestion, etc., and time laid up for repairs. The total of these four items should equal the total time of the motor truck away from the garage during the day.

COST data occupy the other half of the form, and in the first section are recorded the amount of gasolene and oil used, with its cost, the amount of driver's wages and helper's wages, if any, for the pairs divided among labor, chassis and body, with a column for expenditures for substitute vehicles is kept.

From the daily record the monthly record is figured. This form covers one motor truck and includes the total investment for the machine and equipment less tire and storage battery value. The fixed expenses, such as interest on the investment, taxes for garage and other incidental property, license fees, garage, including rent, light, heat, power and administration, are recorded in addition to insurance for fire and theft, depreciation on total investment figured at 20 per centum and property damage and liability. The total of these divided by twelve equals the fixed monthly expense and is entered under that column for the month.

In the lower half of the form a monthly record of total fuel cost, cylinder oil cost, driver's wages, cost of maintenance and repair and tire cost are estimated and the total recorded under the column for variable monthly expense in the estimated section. As the actual cost will vary greatly due to heavy repairs one month and none the next, this could not be taken as a monthly basis, so estimates are so made as to nearly balance with the actual cost for the year. The variable monthly expense added to the fixed monthly expense gives the total monthly expense in both the estimated and the actual columns.

The last sheet is in the form of recapitulations and is exactly similar to that used by the National Truck Owners' Conference. On it the most important items are the number of days operated, the mileage, the cost per day operated, the cost per mile, cost per ton and the cost per ton-mile. This sheet of recapitulations is kept on file at the office of the motor service department and comparisons between different months of the year and different operating conditions are readily available.

The question of labor is of the greatest importance and much care and diligence is used both in the selection of drivers and in their management. The majority of new men hired are men who have been recommended by some present employee who feels himself responsible for the new driver's success. Other applicants for positions as drivers are required to work first as motor truck helpers, and their energy and reliability in that position is carefully watched before their promotion to the driver's seat. The result is a body of men that is well capable of representing the company among its customers and handling the investment of many thousands of dollars with which it is entrusted.

61 Tons of Chewing Gum Handled Each Day By Motor Trucks

Many examples of the manner in which motor trucks have solved deliverey problems are at hand, but a striking one is that of a big chewing gum manufacturer of Chicago. Five 5-ton and one 2-ton motor trucks haul 95 per centum of the 61 tons of chewing gum shipped daily by this firm.

The gum manufacturer, the Wm. Wrigley Jr. Company, for some years attempted to maintain an adequate outflow of its product through the use of a private freight car siding. Delivery was so slow and uncertain, however, that motor trucks were installed. Hour after hour, these machines now "feed" express and freight shipments directly to the railroad stations.

The accurate performance record maintained by the firm shows that the five 5-tonners, which are engaged solely in this work, hauled 1,331 tons of gum and traveled 2,754 miles during the month of October, 1919. The 2-ton unit, used in city delivery, hauled 82 tons and covered 725 miles. The average 5-ton performance for the 23 working days shows that each motor truck averaged 58 trips and 129 deliveries, carrying 266 tons and traveling 550 miles. A gallon of gasolene lasted an average of 3.6 miles, despite the fact that city traffic conditions are encountered.

Motor Trucks Break Live Stock Record Deliveries at Indianapolis

Motor truck delivery recently featured the Indianapolis live stock market, when 6,800 hogs arrived in vehicles, 1,350 more than the former high record of 5,445. This was 2,000 more hogs than were received on the steam and interurban roads and this never occurred before. It required 500 vehicles to haul this supply, some of the motor trucks coming 80 miles. It was estimated that the vehicles, altogether, traveled 2,500 miles and consumed 300 gallons of gasolene. The value of the hogs thus hauled in was $200,000

Norwesco Has Speed

L. D. Speed, who has been representing The Northwestern Chemical Company, of Marietta, Ohio, manufacturers of Norwesco "Chemically Correct" Utilities, in the central-western states, was recently promoted to Central Sales Supervisor. Mr. Speed is an experienced salesman of automotive equipment and will now have charge of the entire central territory, with considerable of a sales organization under his direction.

The newly organized Fay 'bus line, Rockford, Illinois, has placed an order for 24 Reo chassis and will add omnibus bodies. The company will do a general transportation business in Rockford and suburbs.

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Will England Subsidize Vast Fleet of Trucks?

Question of Preparing Against Public Emergency Is Receiving the Attention of the War Office

THE question of governmental subsidization of a vast fleet of motor trucks in England to be used in case of public emergency is being broadly agitated. Commenting on the subject, an English motor truck journal says:

"The future of the subsidized lorry is still apparently uncertain, no official announcement having yet been made as to the government's attitude in this matter. Some people appear to think that the wide powers of impressment which the War Office used so fully at the beginning of the war render a subsidy scheme unnecessary. A little examination, however, entirely disproves that idea.

"Much abused as it has been, there is no doubt that the old scheme contributed to no small extent to the rapidity of dispatch of the original expeditionary force. The fact that resort had to be made to impressment was simply because the old scheme had not been sufficiently attractive to induce enough civil users and manufacturers to take it really seriously. It did not fulfil its object of producing sufficient vehicles.

"Mobilization in any future war will inevitably be more rapid than in the last, because so much material of war, guns, etc., will be ready to hand, and trained efficient personnel will be immediately available for many years to come. How would the War Office provide transport with equivalent rapidity?

"Haphazard impressment is out of the question. True, it made up for the inefficiency of the old scheme at the beginning of the war, but it resulted in the collection of the strangest assortment of vehicles which could possibly have been got together, and it made the problem of spare part supplies of enormous difficulty. The majority of such hastily selected vehicles were worn and there was no time for thorough inspection, and those readers who remember the derelicts which littered all roads to Avonmouth appreciate just what that meant. Moreover, the whole road transport of the country was considerably disorganized thereby.

"In providing for any future war there are two alternatives. Either the War Department must store sufficient vehicles for the mobilization of whatever expeditionary force they think they are likely to require (not overlooking the inadequacy of their last estimate) or (2) they must organize a sound, comprehensive subsidy scheme on lines which are attractive to the using public and the trade.

"The first suggestion has only to be considered to be condemned. We believe that, for the six divisions (as in the original expeditionary force), about 3,000 vehicles are necessary. All things considered (depreciation, interest on capital, cost of storage, custody, maintenance, etc.), the expense of such a scheme to the public could hardly be less than $1,000 per vehicle per annum as against a sum of $500 at the outside for subsidy. Moreover, to hold up these vehicles when they are urgently needed for industrial transport is worse than foolish. They will become out of date, and enormous stocks of spares will have to be kept for them. If that is to be the policy of the War Department, it is high time that the public were so informed and made alive to such a waste of money and transport.

"IF provision must be made against a possible outbreak of war at some time in the future, the obvious solution is surely a subsidy scheme on the right lines. A scheme like the last would defeat its own object. It aimed at too high a degree of standardization, and necessitated the manufacture of a vehicle which was unsuitable to certain uses, and it eliminated the products of many manufacturers which have since given admirable service in the war. Moreover, it offered an inadequate compensation.

"A new subsidy scheme should include all vehicles manufactured by makers of repute, and the restrictions as to body, etc., must be modified.

"We would suggest that the subsidy be increased to not less than $500 initially, with a further $250 annually for three years. The drivers might be asked to join a reserve and paid a fee of, say, $40 a year. We have heard it suggested that the scheme might provide for various firms having large fleets to be organized as one or more units on a territorial basis, the staff being put in a form of reserve so that, in the case of war, vehicles and personnel would be already organized, the foremen being graded as N. C. O.'s and the managers as officers, though whether this scheme would commend itself to those concerned we can not say.

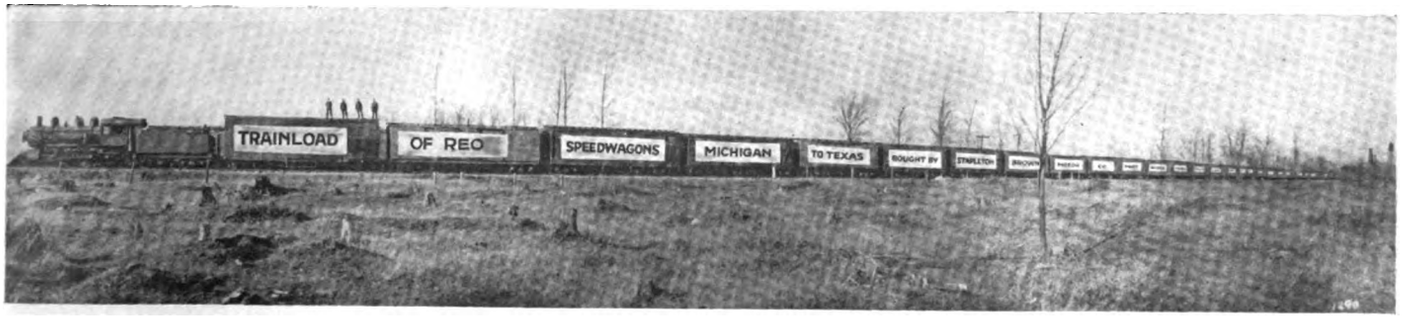
"Nevertheless, the cost of such a scheme would be far less than that of storing the vehicles in the way the War Department appears to be contemplating. We have heard that the officers who carried out inspections in the past were careful to arrange their visits so that they did not interfere with the work of the firms whose vehicles they inspected, and there is no question but that these visits were esteemed by employers as encouraging the drivers to keep the vehicles in good condition."

Train-load of Speed Wagons to Ease Texas' Congested Freight

The Southwest is steadily increasing its forces in the battle against long distances, poor transportation and haulage facilities. "The motor truck," according to Bert L. Russell, of Stapleton-Brown Motor Company, of Fort Worth, Texas, "is to prove the salvation of the Southwest. Through the use of the motor truck, the oil men will be relieved of the haulage problems; the farmers will reduce their expenses greatly by hauling their cotton to market with a motor truck; business, in general, will use machines to make deliveries of considerable distance, thereby reducing the freight congestion. At the same time, deliveries of all kinds will be made in from one-half to one-third of the time now required."

The great demand for motor trucks in Texas is shown by the fact that a train composed exclusively of motor trucks was dispatched from Lansing, Michigan to Fort Worth, Texas, the latter part of November. The train, composed of 29 cars, and loaded with 100 Reo "Speed Wagons," was sent out of Lansing as a "through freight" direct to Fort Worth.

"The demand for motor trucks in that part of Texas is very great," said Mr. Russell in commenting on his large consignment. "We, in Texas, can not meet the demand which we have for 'Speed Wagons' and the 100 which we have just shipped will not enable us to make deliveries to all who have ordered motor trucks.



Train-load of Reo "speed wagons" starting for Texas.

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Fiat Tractor Hauls 100-Ton Load on Level Road

POWERFUL MACHINE DEVELOPS 70 H. P

Largely as the result of experience gained in the war, extensive use is now being made of motor tractors capable of hauling heavy loads on trailers. These are of two general types: the 4-wheel-drive tractor and the 2-wheel-drive machine. The former has been most extensively developed in France, and was used almost exclusively by the French army during the war for the haulage of heavy guns.

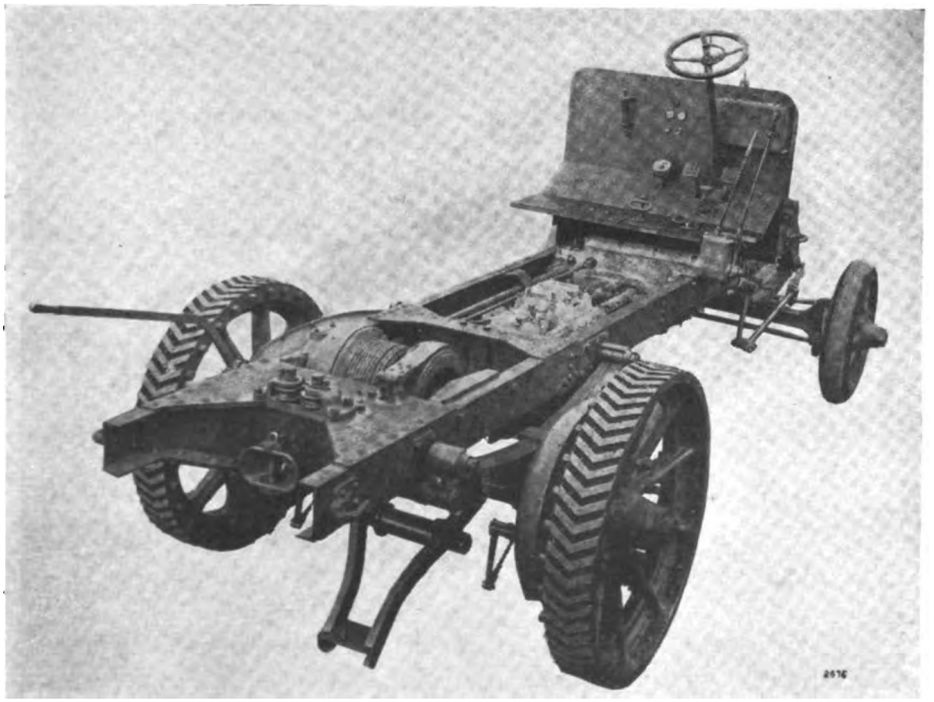
One of the best examples of foreign-made, rear-wheel-driven heavy tractor is the Fiat. This machine carries a useful load of 3½ tons and hauls up to 100 tons on trailers over level roads. During the war it was used for the haulage of guns on all parts of the Italian front, and also to a more limited extent, on the French front. Since the armistice this machine has found an extensive application in Italy and various colonies for hauling blocks of granite and other stone and for forestry work.

The distinctive features of this machine are a special four-cylinder engine, and enclosed chain drive, through a four-speed gear-box and enclosed chains, to big diameter cast steel wheels which are designed to receive patented creeper bands when operating away from good roads.

The engine, which has its four cylinders cast in pairs, with valves on one side, has a bore of 130 mm. and a stroke of 200 mm. It is governed to run at 1,000 revolutions and develops 65 to 70 h.p. Either paraffin or petrol can be used as fuel. The cooling, which is by means of water pump, a tubular radiator and fan, is sufficiently vigorous to keep the engine at a normal working temperature when developing full power with the vehicle standing. Oiling is under pressure to all parts, and ignition is by means of magneto with a storage battery to facilitate starting only.

The power is transmitted from the engine to the road wheels by means of a multiple disk clutch, a four-speed gear-box, a worm-driven cross shaft, and enclosed side chains. The whole of the mechanism is thus completely enclosed against mud and dust. The front wheels are shod with solid rubber tires, but the rear wheels are cast steel having a diameter of 48 inches. In order to secure the necessary adherence for traveling across country or on difficult hills, the driving wheels are provided with patented detachable creeper bands, each band being composed of eight links, and the whole being attached to the circumference of the wheel by means of studs on the inner face of the wheel. With these bands in position the driving wheel operated in exactly the same manner as a trailer wheel, although transmitting the maximum power.

When not required on the wheels, the creeper bands are carried on special platforms above the wheels and also acting as mudguards. There are two hand winches for lowering these bands, so as to facilitate placing them on the wheels. With a little practice four men should be able to mount the bands on the two wheels in three minutes. The tractor is fitted with a differential lock which can be operated from the driver's seat while the vehicle is in motion. It is also provided with a power-driven winch placed at the rear, with steel cable capable of being used forward or rearwards. This winch is made use of for hauling the trailers over very difficult spots, and can also be employed to get the tractor itself out of a difficult position.



Fiat tractor equipped with steel wheels and winch.

There are two sets of brakes, on both the differential shaft and the rear wheels. The two differetnial brakes can be applied separately, this being necessary on sharp mountain curves where the tractor must be held while at the same time making a close turn. This tractor has a normal speed of 6 miles an hour with full load. It will climb gradients up to 15 per centum with a 24-ton trailer load, and without load can tackle 30 per centum gradients. Its weight empty is 11 tons.

Trucks Save Farmers Cash and Sleep on Farms of 40 Acres to 450

Answering the question as to what size farm can use a motor truck profitably, the Service Motor Truck Company has prepared a table of twelve specific instances where the proprietors of the farms utilized motor transportation with great success. The table embraces farmers who operate within a distance of two and a half to thirty miles; that is, they live that far from their nearest towns; the farms noted embrace from 40 to 450 acres. The table follows:

A—Lives 5 miles from town, farms 65 acres; raises berries principally.
B—Lives 20 miles from town; farms 120 acres; principal products, wheat, milk and cream.
C—Lives 20 miles from town; farms 100 acres; principal products, fruit, milk and cream.
D—Lives 2½ miles from town; farms 90 acres; principal products, wheat and milk.
E—Lives 5 miles from town; runs 10 bee farms located 6 to 23 miles from his home. Products, bees and honey.
F—Lives 20 miles from town; farms 240 acres; products, apples, potatoes, hay and grain.
G—Lives 5 miles from town; farms 115 acres; dairy products.
H—Lives 16 miles from town; farms 360 acres; produces hay, grain and garden fruit.
I—Lives 22 miles from town; farms 76 acres; produces fruit.
J—Lives 18 miles from town; farms 50 acres; produces pork and beef.
K—Lives 4½ miles from town; farms 450 acres; produces peas, sweet corn and wheat.

The farmer who has been in the habit of getting up at three or four o'clock in the morning to drive to town with a load of produce can get a full night's sleep and still be at the market with the earliest arrivals when he uses a motor truck.

Trucks Make History in Invasion of Southern Mountain Country

For the first time in history, motor trucks have come down from the mountains in North Carolina with produce from that section, and local men believe that it is only a question of years before this sort of transport will replace the familiar covered wagons that ply in the hill country.

There are very many wagons in the produce trade now, but a few motor trucks are operating and they cover much ground. Hickory business men are considering plans to create a market to the mountains for manufactured products and articles so as to enable all motor trucks and wagons to carry loads both ways.

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"Bull" Prominent at "Horse Feed"

Guests at Banquet of Chicago Local Horse Publicity Association of America Prove to Be Interested Manufacturers of Articles Used by Old Dobbin in His Declining Years

"BANQUET and dance of the Chicago Local of the Horse Publicity Association of America, Congress Hotel, Chicago, December 4, 7 o'clock p. m."—so read the announcement. And on the front page of a Chicago afternoon paper for December 4 a horseman was quoted as follows:

> "We are out to save the horse. This country has been doing a lot of foolish things off and on, but about the most foolish has been to try to get rid of the horse. Yes, sir, a lot of people think it is clever to make jokes about Old Dobbin being extinct and about the future seeing him as a stuffed specimen in a museum. Well, sir, there'll be two stuffed specimens in that museum and one of them'll be a party labeled in Latin 'homo sapiens' and at present known as the lord of creation. The horse has been falling off considerable during the past ten years. The people have gone machine mad. In this country people have got so they confuse speed with efficiency. It's hard to calculate the billions of dollars that have been wasted in the states in the interest of speed and nothing else. The craze has even hit the farmer. The purpose of this organization is to show that the horse is a more efficient power producing object than many of the machines which are replacing him."

JIMINY crickets! I guess that fellow tells the automobile and motor truck crowd where they get off, to say nothing about the tractor people. Well, well! If the rest of the crowd at the banquet are to be of his stripe, that banquet is going to be a poor place for anyone who has ever been foolish enough to ride in an automobile. Gosh, I'll bet those horsemen never lose *their* sense enough to drive any substitute for the good old horse. It's a cinch that Michigan Boulevard is going to be the scene of some excitement to-night. Those horsemen will be driving up and down there to the Congress Hotel and will simply crowd those few thousands of automobiles and taxis clear over into the lake. Say, that's going to be worth seeing and I'm going to be there to watch the fun. Well, 6:45 p. m., but those horsemen haven't begun to show up. But of course this is going to be quite an affair and no one would be expected to be ahead of time. They'll be coming soon now, though. I can see that bunch of taxi drivers there at the curb having to make way when those coaches and fours begin to roll in here. Seven p. m., and still no signs of even a carriage or single buggy, and not even a saddle horse in sight. Surely that notice said the Chicago Equestrian Club would be represented. Perhaps they are going to the side entrance. No, the side entrance is just as much jammed with autos as the front, but not a horse to be found anywhere.

What do you know about this? Here's a big banquet of horsemen about to be held, but not a horse around. Are they all late, or it is possible they will use some other means of transportation? There must be some explanation. Perhaps these men are such good friends of the horse that they won't bring their beloved steeds out a cold night like this and let them stand outdoors in the cold for several hours while they are inside enjoying themselves. Come to think of it, this snow was rather sudden, and it is just possible they haven't had time to get their horses' feet "roughed" up and they don't dare take them out on these slippery pavements. Anyhow, I'm going inside and see about this affair. I'm hungry, and if I could only camouflage myself to look like a horseman I'd like to help put some of the feed away and listen to some of the after-dinner speakers who will in all probability explode a lot more fallacies which seem to possess the American public.

I slip into a chair by a small table and glance over the waiting guests. They look just like ordinary folks, no better and no worse—another surprise. At my elbow on the table is a pile of literature, evidently intended for perusal by the horsemen while waiting. I pick up a paper with the heading: "Organization Issue, Horse Power Bulletin," Vol. I, No. I. I glance over it and several statements catch my eye and give me a start. Under the caption, "Noted Speakers in Praise of Horse—600 Enthusiasts Pledge Their Support to Bring Him into His Own," I read:

> "Paul Revere would have been a mere incident if it had not been for the horse. The same thing is true of Sheridan's ride through the Shenandoah Valley, for there would have been no romance whatever if Phil Sheridan had made that ride in a Ford automobile."

WELL, now, *there's* something to think about, and I must confess I never had thought about it before. And now that I do think about it, I can't help but wonder what would have been the consequence in both cases had those two men been without horses. And then I can't help but think—"but what if they'd had automobiles?" Of course the romance would have been lacking, but think how many more Minute Men Paul could have routed out of their beds that April night, while Phil could have covered that 25 miles two or three times over, and carried twelve or fifteen men on the running boards each trip. And I also wonder whether, if a fellow had come whizzing by either of those famous riders, in a flivver, and offered them a ride, either one of them would have accepted it.

But I read on in the Bulletin and my eye rests on the following:

> "This nation is in the fierce grip of an orgy of frenzied prodigality, which situation is demonstrated by a glance at the daily record of mortgages filed, especially in the smaller towns in the West and Southwest, showing that many people are obliged daily to mortgage their farms to enable them to become an owner of some kind of motor-drawn car, for which doubtless a high percentage have no absolute use."

H'mm! Guess that's show some of those automobile men where their business has led our nation. I've been accused of writing long sentences, but the writer of that one, and some that accompany it, could give me a handicap of two or three lines and beat me by twenty-five words. And on the same page I find the statement, obviously by the same author:

> "They (business houses) should remember that motor driven vehicles have no speed in large cities; that the deliveries from the dry goods stores are today made on the same schedule that they were made when there were no motor driven vehicles on the street: that motor driven work vehicles do a minimum of work for a maximum of expense; that no machine has yet been built which can compete economically with the horse within the working area of a horse, and that the working area of the horse is where the business is done, where the tonnage is handled, and not in the sparsely settled, outlying suburbs; that a per ton mile basis of calculation furnishes a proper comparison only within certain distances of where the bulk of the tonnage is handled, all of which, as shown above, lies within a horse's working area; that 80 per cent of the tonnage in any great city is handled on short hauls, and that on such short hauls horses can outwork the truck for half the money; that trucks, because of their lack of mobility, cause more congestion in the city streets than horse drawn vehicles."

Whew! There was a lot more to that sentence, but I ran out of breath, and when I got to that statement about "causing congestion" I couldn't help but wonder where the man lived that could say all that without stopping for breath, and who thought motor trucks caused more congestion than horse-drawn vehicles. One thing sure, he has never driven around the Loop district of Chicago, else he wouldn't say a thing like that and expect anybody to believe him. And if he really believes some of the other pages in that sentence he's a very credulous individual, to say the least.

AH, but here's another gem of thought, abstracted from one of his sentences of only forty-six lines:

> "Business houses would do well to remember * * * that a horse eats only when standing in a stable, costing nothing while in motion."

And I think of the Irishman who, upon being told by a salesman that a certain stove saved half the coal, said he'd take two and save it all. For it doesn't require two guesses to tell what that Irishman would do with a horse, in view of the above fact (?)—he'd simply keep him in motion and save all his feed. But I turn a page and see a caption reading, "Horse Labor Actually Low in Cost," and since this is indeed news to me, I glance at the following lines. I find that the author of these lines, by charging horse feed at what he believes it costs a farmer to raise it, and not at the market value

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of the feed, which the farmer could receive for it if he sold it instead of feeding it to the horse, figures that the farm work horse costs for feed and all other expenses, $128 annually for maintenance, less 13 tons of manure at $3 per ton. And again I think of a story I once heard, about the Hebrew peddler who was trying to find a liveryman who would keep his horse for him at the lowest possible rate. He was quoted prices of from $20 to $25 per week by various stables, but finally found one liveryman who quoted a price of $15 per week. "Very well," said the Hebrew, "I'll pay $15 provided you will save the manure for me." Whereupon the liveryman replied: "If I board your horse for $15 per week there won't be any manure."

But I am prevented from reading farther by the announcement that the banquet is served in the Gold Room. As soon as everyone is seated a photographer in the gallery announces that he is about to take a flashlight of this most glorious event. After requesting everyone to remain quiet for a few seconds, he said, "Not quite so serious, please." And then I realized that although this was supposed to be an occasion rather comparable to the return of the prodigal son, and a time for general rejoicing on the part of the friends of the horse, because he was soon to be "brought into his own," nevertheless there was rather more of the atmosphere of a funeral, as indicated by the photographer's remark.

I ENJOYED most of the meal very much, as I had acquired a hearty appetite by waiting out front to see the horsemen drive up to the hotel, for fresh air always makes me hungry. But when I got to the meat I sort of hesitated. There flashed across my mind a statement I had read from the Horse Power Bulletin, down in the Elizabethan Room, just a few moments before. It was a remark made by Dr. Rommel, of the Bureau of Animal Industry, United States Department of Agriculture, speaking at the meeting of the Horse Publicity Association of America, held in New York just a short time ago, and read as follows:

> "There is no market for a horse of that kind at the present time. The question is what to do with these horses. All kinds of relief measures have been considered, and Congress has made it possible for the Department of Agriculture to inspect horse meat just as it does other meat and an outlet for horses of that character for meat purposes is therefore made."

I began to wish I had not read that Bulletin. And then I remembered having seen that very morning, in the Weekly News Letter of the United States Department of Agriculture, a fac-simile of the government stamp placed on horse meat which has been passed by federal inspectors. All of the many reports which I had heard regarding the sale of horse meat in various cities passed through my head. I studied the menu carefully, but it was in French and I didn't know the French word for horse. "Filet" was sort of familiar and I had sort of formed the idea from previous experiences with French menus that it meant a kind of steak or some cut of meat. But "mignon bordelaise" might mean cow or it might mean horse, or it might just mean the way the meat was cooked.

I saw that all the horsemen at the table at which I sat were eating the meat with apparent relish, but then—oh, if I but knew whether these friends of the horse would go so far as to help create a market for him by *eating* him. But anyhow, I was quite sure I had heard that horse meat was a good deal like beef, only perhaps a little sweeter. Surely a little horse meat wouldn't hurt me if I didn't know for sure that it was horse meat when I ate it. At any rate, I ate all of it but the fat, and it did taste rather sweetish, and a good deal like beef. I didn't care to make any inquiries just then, and haven't seen any need of it since. Perhaps it was, perhaps it wasn't.

WELL, the banquet is over and a man at the speaker's table rises and introduces the toastmaster for the evening, M. A. Traylor, president of a Chicago bank. Mr. Traylor, upon assuming his duties, identifies the man who introduced him as a Mr. Gossard, whose name appears on the letterhead of the Chicago Local of the Horse Publicity Association of America with the caption "Farmer and Stockman." This caption seems to amuse Mr. Traylor. He observes that Mr. Gossard may be both farmer and stockman for all he knows, but if he is either or both he has certainly managed to camouflage his occupation very cleverly before his Chicago friends, among whom he is much better known as a manufacturer of a certain article of ladies' wear which the toastmaster did not care to mention by name, but which he stated was sold in considerable numbers especially in the popular size known as "the perfect 36." And, now that he mentions it, I seem to remember having seen Gossard's name and trademark on a certain unmentionable around by bedroom, but can't recall seeing it in connection with horses. I gather from other remarks, however, that Mr. Gossard is present as a representative of the Equestrian Club, as well as a stockman. The toastmaster makes some very interesting remarks in introducing some of the speakers. For instance, he explains that he had tried to obtain the pedigrees of the various speakers, in order that he might use them in whole or part in introducing them. Apparently he was not very successful, for he adds that "if the Percherons and Clydesdales being sold at the Live Stock Show have no better pedigrees than they have given me of these speakers, the sellers are up against it. They have nothing but grades." I'm not sure whether he is trying to enlighten the audience as to the lack of relation between the speakers and the horse, or whether he is simply trying to square himself with his own conscience.

However the speakers are very interesting, and pass many compliments upon the progress made thus far by the Publicity Association. I was not mistaken as to the probability of hearing a lot of facts which would be new to me, and the explosion of a lot of fallacies regarding motor vehicles in general. But some of the statements which at first seem new whirl around in my head an instant and then connect themselves up with some very similar remarks I recall having heard years ago from the old farmers and countrymen around my home down East when automobiles first began to make their appearance on the country roads twenty miles away from the city. These old farbers shook their heads ominously and predicted dire results from the "auto-buggies" which attained the frightful speed of twenty or even twenty-five miles an hour on the down grades. I can remember some of the more religious ones remarking that the Lord never intended that men should travel in automobiles or we would all be born with wheels instead of legs, which certainly seemed like an unanswerable argument. Incidentally, those old farmers saw nothing wrong in buying the fastest horse they could find in order to make their neighbor take their dust going to and from church, and they got sufficient pleasure for a week's hearty enjoyment from refusing to turn out of the rack and let an automobile pass them.

I AM quoting the thought expressed by one speaker, if not his exact words as follows: We want to live too fast—we would live longer and probably be happier if we would stick to the saddle and the buggy." And I was sacrilegious enough to think to myself: "Perhaps so, but if we had to go back to them there'd be a lot of us who would say, like the old Saint, 'oh! death, where is thy sting?'" Another speaker brought forth another dusty, thread-bare argument which I had not heard for ten years or more and which I thought was forgotten. But no, he advanced it with great gusto and it was received with acclaim on the part of the audience. It was that old statement that when it came to counting a girl the automobile could never compete with the horse and buggy, for no young man wanted to be compelled to steer an automobile while taking a girl driving when he could just as well have a horse which would do the driving for him and leave him free for more pleasurable occupations. Ha! Ha! Some joke! I've tried them both and can speak from experience. Just as though you couldn't stop an automobile whenever you wanted to, to allow the engine to cool, or to wait for the magneto to demagnetize the armature, or any one of a thousand other reasons for stopping where nothing could be done but just wait for things to straighten themselves out and give you all the opportunities in the world, without the possibility of being interrupted at critical moments to yank the horse out of the ditch where he had wandered seeking grass to eat, or having the buggy wheel hit a stone at the psychological moment and converting what was intended to be a tender osculation into a collision which knocked out two or three front teeth.

Yet another speaker eulogized the horse, spoke of the love he held for him, the years he had used and owned horses, and wound up with the boast that he had refrained from buying an automobile until two years ago, when, tiring of being crowded off the road by the automobiles

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he had bought one in self defense so as not to have to take the other fellow's dust any longer. And I felt like exclaiming: "You said something, old fellow."

The heavy artillery against the internal combustion engine, whether in the form of automobile motor truck or tractor, was unlimited by Walter Monroe, who was in charge of what was reported to have been a very exhaustive investigation to ascertain the exact status of the horse today.

He stated that one of the first facts they learned was that a great deal of the propaganda about horseless cities and farms is written without foundation. Apparently the American public has been sadly misled into buying automobiles and motor trucks under the erroneous impression, fostered by the motor interests, that the horse is passing out of existence. Shame on anyone who would try to make an American citizen believe that the number of automobiles and motor trucks on our roads and streets is increasing, and that the number of horses on the same roads and streets is decreasing. Their investigation showed that there are at present more horses being used in proportion to the population than at any time in history, and that there are also more in proportion to the number of improved acres of agricultural land, as well as in proportion to the number of farms. The qualification of "in proportion" in each case seemed a wise one, inasmuch as the official government figures with the "in proportion" omitted certainly showed a decrease at the beginning of 1919 over the same date in 1918.

HOWEVER, the investigation had disclosed other facts; for instance, only one-seventh of the horses in the United States are located in cities, the remainder being on farms. Hence, even though the cities should become entirely horseless, it would mean only a reduction of one-seventh of the number of horses in the country. Nothing was said about the average life of a horse in the city and on the farm. Perhaps it didn't occur to the investigators that even though there were fewer horses in the cities at any one time, nevertheless their shorter life in the cities meant that it required a much greater proportion of colts to maintain this part of the horse population than the part which is on farms and which has a much longer average life.

Mr. Monroe made one admission which seemed somewhat at variance with some of the other opinions expressed by the speakers. He admitted there had been a very rapid growth in the number of automobiles and motor trucks, but expressed the belief that this growth had been somewhat abnormal and that the "pendulum will swing the other way." Altogether, his investigation appeared to make him very optimistic regarding a rosy future for the horse. For my own part I could not quite understand just how he could draw some of his conclusions from the figures which he presented. Apparently he, as well as most of the other speakers, assumed that all improvement and development in motor trucks and automobiles is a thing of the past, and that if at the present moment a motor truck is slightly more expensive than horses on some particular short-haul job it will remain so forever.

There were several speakers called on for four-minute talks. The horse's place in history and romance was touched upon a number of times. Two very pathetic and heart-touching poems were recited. One was the ancient "Arab's Farewell to His Horse," while the other was a recent one, supposed to have been written by a soldier on the battlefields of France in the late war, and pictured the mute suffering of the faithful cavalry and artillery horse where he was helping men fight their battles. The statement had been made several times that the horse was man's best friend, and a number of people present had expressed their love for the horse. I could not help but feel that it was indeed a strange kind of love which would strive to have the horse retained at any kind of work where such agony fell to his lot as was described in the verses mentioned.

ONE or two of the speakers had remarked that the horse could not speak for himself and that it behooved his friends to speak for him. I could not help but wonder whether, if he could speak, he would not express the wish to be allowed to pass quietly out of the life of toil and suffering which has been his lot not only in war but in peace as well. For my own part I feel toward horses as a whole very much as I felt toward one which had slipped on the icy pavement and broken his leg, and which I killed instantly with a single shot in the temple, in order to prevent a well-intentioned policeman from torturing him further after he had shot him three times in the center of his forehead with no effect except to add to his suffering. I was sorry for the horse, and while I hated to be the one to kill him, I felt I could do him no greater kindness. And I venture to say that most work horses, if they had their choice, would elect to receive the merciful bullet rather than to continue their life of pain and drudgery to which they are subjected by those who love (?) them.

But the president of the Chicago Board of Trade disclosed a fact which showed me what kinds of friends of the horse were in the audience. Upon being introduced by the toastmaster he remarked that he had come there with the expectation of finding a meeting of horsemen and breeders, but after mixing with the crowd while waiting downstairs he had come to the conclusion that "most of those present had something to *sell* to the horse."

A little later another speaker, who paid glowing tribute to the horse and spoke rather slightingly of the automobile, with which he claimed to have had considerable experience, cleared up a point which had been worrying me all the evening. He proclaimed that he was the proud possessor of a horse or two and that he rode horseback whenever occasion permitted. He said he was curious to know just how many of those present actually owned horses, and requested all who owned one or more to raise their hands. The result probably was as unexpected and disconcerting to him as to some other members of the audience, for only a small percentage of those present raised their hands. Well! Well! And to think that I stood out in front of the hotel waiting to see these horsemen come driving up in carriages or buggies, or at least on horseback, and here this crowd is made up principally of a lot of men who have harness, horseshoes, feed, or something else which they want to sell to owners of horses, and are beginning to realize that the automobile, the motor truck, and farm tractor are beginning to cut into their business pretty seriously.

BUT, instead of doing like one buggy manufacturer, for example, who quit making buggies and makes cabs for motor trucks instead, and at the same time makes considerably more money than he ever made in the buggy business, these men are trying to stem the incoming tide of progress with a puny dam of loose sand, and instead of using their present resources in building up a firm foundation for some line connected with the modern vehicles of transportation, except to spend them in trying to convince the American public that the automobile is "an inefficient and uneconomical toy," as one speaker at the banquet proclaimed.

The dangers of automobiling were touched upon several times, and the deaths and injuries from auto accidents in large cities mentioned. One speaker, who claimed to be a horseshoer, declared that the horse could be brought back, and should be; that many of the gas bombs of the automobile people would prove to be duds and would be returned to them with disastrous effect. Further, that if the use of motor trucks and automobiles continued to increase, that the death rate would also increase tremendously, and for his part, he would want to be an undertaker. Which declaration was received with wild applause.

The most noted speaker of the evening was Major General Leonard Wood, who had been asked to speak on "The Horse in War." He was not present during the banquet proper, but appeared when the evening was about half spent. He spoke for a few minutes on the use of horses in war, and stated that they would undoubtedly continue to be needed for a long time to come for that purpose. He emphasized the difficulty the army officials had in obtaining the kind of horses they wanted. Out of the several million horses

(*Continued on page* 90.)

Clydesdale Increases Capital

The Clydesdale Motor Truck Company, of Clyde, Ohio, has just announced an increase in its capitalization from $500,000 to $1,500,000. The original capitalization of the company was found inadequate to take care of the rapidly expanding business. The present authorization permits the issuance of $1,000,000 worth of common stock and $500,000 worth of preferred stock, at a par value of $10. The entire preferred issue has been underwritten by a well-known Cincinnati banking concern.

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Central Illinois Dealers Enjoy Prosperous Year

PREPARE FOR GREATER 1920 TRADE

BLOOMINGTON, ILL., Dec. 20.—Motor vehicle dealers of central Illinois closed a prosperous year and are optimistic concerning the coming twelve months. The dealers in nearly every city of consequence are in favor of a winter show and the preliminary arrangements are being made already in Bloomington and Peoria. Both cities will stake an exhibition immediately after the Chicago exhibit. This section of the state was never as prosperous as now. Securing a large proportion of its wealth through the agricultural resources, the high prices of everything raised by the farmers and stockmen have given them a large surplus which they are planning to invest in motor vehicles. The volume of inquiries that is being reported makes it certain that every dealer will be able to dispose of his quota of passenger cars, motor trucks and tractors very early in the new year, and this condition has produced a buoyant feeling in all lines of the motor industry and the various concerns are laying their plans to handle the largest business in their history during the new year. The only discordant note to disturb the harmony lies in the effects of the coal and steel strike upon the output of the various factories, thus possibly reducing the quota of each dealer.

The dealers of central Illinois have been generally joining the national association and a fine list of members was secured in this section of the state. Support is being given to the stabilized insurance movement and the establishment of an auditing department for the handling of freight charges upon which there are overcharges. There is believed to be room for many reforms which can be put over by the national organization. The improvement of the roads in Illinois is one of the most notable epochs in the motor vehicle industry, and the various associations of dealers are coöperating with other business men and the drivers of passenger cars and motor trucks in hastening the construction.

This state is expending $60,000,000 in one contract and the individual counties and townships will equal this sum in the construction of the laterals from their sections to connect with the trunk line highways being built by the state.

There were 490,000 licenses issued for motor vehicles in Illinois during 1919, against 389,761 in the preceding year. The revenue from the licenses aggregated $5,500,000. With the increase for 1920 licenses, the revenue for the new year may reach $7,000,000, all of which goes to construct the trunk line system of concrete roads.

Duplex Adds New Model.

Power for the new medium capacity Duplex Limited is supplied through a 4-inch by 5¼-inch engine having an S. A. E. rating of 25.6 horse power. This motor is a modified class "B" design so successfully used in government work. At normal speeds the motor develops more power than its rating would indicate, and its construction permits of high speeds without danger of injury. On high the Duplex Limited will travel at from 5 to 30 miles per hour. The Duplex company contends that motor truck speeds should be secured through motor power and not through a low gear ratio. This accounts for the adoption of a motor which at first glance, appears to be too large for a motor truck of medium capacity. All the essentials necessary in motor truck design to guarantee speed, safety and economy are found in the new Duplex Limited, surplus motor power, pneumatic tires, a high gear ratio. Everything that will contribute to making this a strictly high class, steady service motor truck has been included by the manufacturers. Electric lighting and starting equipment is a part of the standard equipment. The Duplex factory reports that its expectations have been surpassed with regard to the way in which the market has responded to the news regarding this addition to its line.

Kerosene in Lubricating Oil Is Death Liquid to Truck Engines

A campaign to call attention to the necessity of changing oil in motors every so many hundred miles is being advocated. It is pointed out that there is so much kerosene in gasolene to-day that it has a tendency to run down past the pistons, get into the lubricating oil and thin it. The kerosene cuts the thin film of oil on the wearing surfaces of the pistons, piston rings and cylinder walls. With the film of oil on the wearing parts of the motor broken, friction, the bugbear of motor efficiency, starts in. The pistons work up and down through broken films of oil in a lubricating substance that has lost considerable of its richness and thickness.

There is little chance of changing the quality of the gasolene. Therefore, to prolong the life of the motor the only thing to do is to change the lubricating oil frequently, possibly every 500 to 1,000 miles. An experiment is instanced as proof that it is the non-lubricating qualities of the oil that damages motors.

A motor was brought into a shop with almost .015 inches wear. The motor was ground to .020 inches oversize, fitted with new pistons, put on the block and filled with good, clean oil. The motor was then run continuously for 60 hours and during this time the oil was changed three times. When the motor was taken down it showed no wear. The motor was again put together, oil was taken from an old motor truck and the motor put through the same 60-hour test without any change of oil. It showed .005 inch wear, indicating that it is the non-lubricating qualities of the oil resulting from the kerosene working past the pistons and mixing with it that causes the deterioration of motors.

Great Development Assured In Motor Truck Industry

NEED FOR RAPID TRANSPORTATION CAUSE

The day has hardly come, it is true, when people have begun to wonder how the world ever got along without motor trucks, but a sudden realization of the importance of motor trucks in modern industry and agriculture comes to a larger number of people daily. Motor trucks have been in practical existence more than ten years and yet to-day in many sections they are received with nearly as much concern as the early-day railroad trains, which held constant interest—especially for the boys who liked to play brakeman and watch the unloading and the switching—and furnished discussions for the professional whittlers who loafed about the corner grocery.

Truly, the beginning of the motor truck era is but approaching. The big future, many believe, lies in short-haul shipping and is bringing the farm closer to the market. It is in long-distance, rapid transportation that the railroad is highly efficient. Short hauls are inconvenient and excessively expensive. Local freight trains, stopping every few miles to set off cans, interrupt heavy traffic and increase consumer costs.

Motor truck train installations, with machines making regular trips, are already solving the problem, but only in comparatively isolated instances. Think of the development that is to come and the efficiency that is to be gained through ever-increasing numbers of installations. People in a city do not talk to someone in the next block or a neighboring borough over long-distance trunk lines. Local circuits exist for that purpose. But the railroads have not enjoyed similar efficiency.

It is alone the lack of transportation which causes many farm products to remain in the country and spoil for want of market. Rural motor express lines, working on schedule, are relieving this situation to-day in certain sections, but such methods are yet the exception rather than the rule. Increased development is coming just as fast as the merit of the "truck idea" can be demonstrated. There need be no fear as to the future market. It is tremendous!

The wonder is that over a half-million motor trucks have been placed in use in this country with so comparatively little having been done to foster and promote the motor truck idea. Motor truck manufacturers, dealers and salesmen are beginning to realize this fact and ship-by-truck propaganda, truck tour development campaigns, long distance demonstrations and countless other education methods have been instituted. The high cost of living has become so serious a matter that motor truck service is an absolute necessity. Of its own accord the industry will develop fast in the next few years, but infinitely more so if intelligent and effective methods are applied to stimulate it, until a veritable fabric of motor truck lines has been knitted nation-wide.

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Relationships in Truck Selling

By E. A. HASKINS
Service Manager, Republic Motor Truck Company

IT clarifies the subject under consideration if we change the words, "service relations" to "maintenance relations." The much buffeted word "service" can be relieved of its mystery if given the common sense interpretation "maintenance." I will, therefore, ask your consideration of the subject, "Maintenance Relations Between Parts Manufacturer, Vehicle Manufacturer, the Distributer, Dealer and Owner."

In the following the term "dealer" is used in a general sense, meaning the vehicle manufacturer's distributing organization. We will also make two general subdivisions; one the furnishing of parts and the other their installation (under which will come the general discussion of instruction).

If every seller of merchandise had vision enough to realize the value of proper maintenance, this subject would need no discussion. Under existing conditions, however, the future sales value (good will) resulting from legitimate business-like effort to keep equipment in operation, has been subservient to production, immediate sales and immediate profit. Some seem to have considered this maintenance problem a burden or necessary evil rather than an important essential to continued popularity and sale of their product. Others have surrounded it with a veil of mystery, intimating that there is only one place to secure parts and only one way in which parts can be made to perform satisfactorily the function intended. This does not apply to parts other than those covered by the subject under consideration.

WE like to think of maintenance as vital, still incidental to the real problem—sale of finished product. We are not in business to sell parts, but to keep equipment in operation. We are not vitally interested where the customer secures supplies necessary to maintain his vehicles as long as the parts are up to standard.

There are two ways of visualizing the interdependence of all parties under discussion. *First:* Consider each as a link in a chain, each one responsible to the link on either side. Starting with the parts maker as the ring end through the vehicle maker, distributer, dealer to owner, we find the owner dependent for satisfaction upon the parts maker. He may not appreciate this and if dealer, distributer and vehicle manufacturer, especially the latter, measure up to their responsibility, or rather opportunity, the owner will never need to have it forced upon his attention. Likewise, dealer, distributer and finally the vehicle maker are hampered or helped by the parts maker's maintenance facilities.

Let us not throw too much of the load upon the ring end of the chain. Let the vehicle manufacturer consider himself as wholesaler or jobber carrying a stock of suitable size to cover several months' requirements and endeavor to educate the distributer and dealer to appreciate that they are the retail organization and upon them rests the opportunity of carrying a stock sufficient to care for day-to-day demands so that the hook end of the chain will really assist in catching additional buyers.

Second: Consider a pyramid with the parts maker at the apex and the owner at the base. All our increase in business is based on owners' satisfaction. If the parts makers' product or service is not up to standard, the owner will spread dissatisfaction so thoroughly as to ultimately hinder the parts maker's sales. So the parts maker is vitally interested in the owner's satisfaction, even though he does not get into personal contact with the owner, as do the others.

EVERYTHING bears a price—even satisfactory service costs something. The question of discounts and lists prices has caused much discussion. It is manifestly unfair for the parts maker to establish list prices and discounts so that the price to the owner, if passed direct by him, is much different than when handled by the vehicle manufacturer and his distributing organization. It has never been our policy to attempt to hold to the parts maker's list if this provided a greater or less profit than was considered legitimate. We have endeavored to make our service and parts division sufficiently attractive so that after the dealer has been properly started by the vehicle manufacturer he will have real financial reason for keeping it up. The real fundamental of maintenance is speed or promptness of repairs. What matters a few cents more or less compared to a vehicle tied up for several hours or days?

It would greatly simplify matters if the parts maker would establish a discount sufficient to enable his list price to mean something only as a comparison. Let him protect the vehicle manufacturer regarding deliveries and not supply owners or dealers direct when he is not shipping the same parts to the vehicle manufacturer, who may have orders for similar parts that have remained unfilled for some period. If the distributer is worthy of the name let him be the headquarters for parts and repairs in his territory. If the one nearest the owner is honestly trying to give service, justify his efforts. Do no more yourself than you are legitimately asking him to do. Do not let anyone get the impression that he can get any more by going over the dealer's head.

Let us all protect the next link toward the hook end of the chain whenever he is trying his best, but of paramount importance keep the owner happy even at the sacrifice of pride or immediate profit. I have no patience with the dealer who is not trying his best to help. Factory assistance on more than one occasion has cost him money.

If the parts manufacturer's product is very special, demanding more care, knowledge or experience to maintain than can be expected of the vehicle dealer's force, let the parts manufacturer establish his own widspread repair system and work with the dealer in caring for such work. The vehicle manufacturer should receive no remuneration from work performed without his knowledge or assistance and without material in which he has money invested.

The parts manufacturer should appreciate the necessity of informing the vehicle manufacturer in advance of proposed changes in design, so that we will all have opportunity of preparing to care for these changes and will not have to wait until such changes are in production.

As an ideal we therefore have the owner cared for by the dealer who has a reasonable stock of the most active repair parts and is dependent upon the distributer for replenishment of his stock and for parts seldom used, as well as expert mechanical assistance and instruction. The distributer in turn depends upon the vehicle manufacturer for his supply of parts so that his efforts can be roughly checked. Failure of any one should permit of the owner's request upon the parts maker receiving prompt and immediate attention, but those at fault should be informed of their shortcomings so that they can prevent repetition.

THE price demanded by the parts maker from the owner should be sufficient to discourage direct dealing if the vehicle maker and dealer are making an honest effort in the owner's behalf. The furnishing of parts is by far the most important feature of satisfactory maintenance. Parts themselves, however, are of little value unless properly installed. Therefore, every vehicle manufacturer should be able to secure suitable instruction from the parts maker so that he in turn can properly instruct the dealers' organization by shop courses, schools and printed instructions.

Let us all help, not hinder. There is no such thing as "free" service. Therefore, if it cost money, charge for it; if we are wrong, admit it. Give uniform treatment. Make anything worth while worth money to be appreciated and some of our problems will be simplified.

The number of motor trucks in possession of the War Department of Great Britain at the time of the armistice was 51,950.

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Truck Wins Laurels In Earth's Far Corners

Supplants Horse in America, Elephants in India, Oxen in Philippines and Burros and Camels in Africa

THE day is not far distant when motor trucks will operate over highways built solely with that purpose in view. When that day comes motor truck transportation will have reached its height, according to a manufacturer, who says:

"The one big thing the war did for the motor truck was to provide it with an opportunity to prove its universal worth as a transportation factor. In other words, the war accelerated its general adoption in the commercial field. It is commerce and industry, not war, that concerns us to-day.

"If we are to discuss the motor truck, let us get down to present facts and future possibilities.

"All about us are evidences of its utility. Each day sees the motor truck entering a new field of endeavor. Motor trucks are now hauling cane brake in the Philippines. Oxen have been used there since the beginning of the industry. Down in India motor trucks are replacing elephants, oxen and men. In South America they are supplanting the burro. In various sections of the world, hitherto unexplored and undeveloped, they blaze the trail for enterprise. The remarkable thing about it all is that transportation by motor truck has not only proven itself more practical but more economical than the older means.

THE department of agriculture estimates that for the year 1918 motor truck hauls from farm to shipping points averaged 11.3 miles, while wagon hauls averaged nine miles. The motor trucks made 3.4 round trips per day over the 11.3 miles while wagons made but 1.2 trips per day over the 9-mile route. The average cost per ton by the horse-drawn vehicles was 30 cents per mile for wheat, 33 cents for corn and 48 cents for cotton. The motor truck haulage per ton-mile averaged 15 cents for wheat and corn and 18 cents for cotton. In several states the cost of transporting wheat was as low as 9 cents per ton-mile while the lowest cost by wagon is estimated at 22 cents per ton-mile. Quite a saving there, without taking into consideration the value of time saved and the economy in labor.

"The figures compiled by the government show definitely the importance good roads play in the reduction of costs. For instance, in the east north central states, which boast miles of improved highway, the cost of haulage by motor truck was but 9 cents per mile in 1918. In the New England states, the middle Atlantic states and the west north central states the cost was 14 cents. The cost increased to 18 cents in the South Atlantic states, where there are a limited number of improved roads, and to 29 cents in the Rocky Mountain district, where, of course, the grades effect all means of transportation.

"Contrasted with these figures are these showing the costs of hauling by horse-drawn vehicles. In the east south central section, the cost is 36 cents per ton-mile, more than three times the cost by motor truck. In the south Atlantic states it is 39 cents, more than twice as much as by motor. In the Rocky Mountain distict the cost reaches 42 cents, 13 cents more than the motor truck costs.

"After considering those figures one stops to wonder what the present cost of foodstuffs would be if it were not for the motor truck. In New York more than 55,000 motor trucks are registered. The average cost of hauling by motor truck in New York is 14 cents per ton-mile according to last year's figures. The cost by wagon is estimated at about 30 cents. There is a difference of 16 cents on each ton per mile. In a year the saving would run into an enormous amount.

"INDIANAPOLIS we find leads all other centers in transportation of hogs by motor truck. This may be attributed to a great extent to the fact that it is the hub of a system of improved roads. These figures, by the way, disclose the great advances made by the motor truck in the transportation field during 1918 and preceding years. The chart shows that 462,313 hogs were received in Indianapolis during the last year against 271,994 in 1917; 173,191 in 1916 and 96,591 in 1914. Indications are, according to reports from the Hoosier capital, that 1919 will see the mark reach 600,000. This, of course, does not include cattle and other live stock.

"We have no figures at hand which will show the comparative cost of transporting live stock by motor truck and by wagon, but it may be taken for granted that the avrage differences which prevail in the transportation of wheat will prevail here also. The greater number of trips possible with the motor truck and the time-saving alone is proof enough that it is more economical.

"But to get into the future of transportation by motor truck. It is not necessary to state that it is a factor as yet only in the early stages of development. True, there are numerous motor truck trains, rural express routes and intercity routes operating in communities throughout the United States. Haulage concerns, alive to the situation, have amalgamated to reduce the possibilities of idle machines, light return loads and to render improved service to patrons. Many commercial houses and manufacturing plants are operating private lines. The post office department has inaugurated parcel post routes. But we may yet say that the motor truck has not even approached the height of its possibilities as a transportation factor."

Truck Engines Furnish Power to Factories During Coal Shortage

The engine pictured below is the Buda —4¼ by 5½—used by the Service Motor Truck Company in its 1½-ton, Model 36, and 2½-ton, Model 51, motor trucks. Due to the coal shortage it was obliged to do something of this sort to keep its factories running. This motor truck engine was, therefore, rigged up on an improvised testing stand and kept part of the machine shop running during the recent coal crisis.

The engine successfully handled two large radial drills, eight lathes, four shapers, ten drill presses, six milling machines, two threading machines, four tool grinders, one key setter and one tapping machine. It handled them with as much ease as did the six electric motors which were, of course, installed in more advantageous positions. All of the machines operated by this motor truck engine are under a heavy and constant load.

The engine ran continuously, at full speed, from 7 a. m. to 12 noon, and from 12:45 p. m. to 4 p. m. One of the engine testers is seen standing by the engine. He looked after the fuel and lubrication.

Truck engine used in factory during coal strike.

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National Shows Serve as Schools to Transportation Pupils

Educational Features of New York Motor Truck Show Will Draw Attendance This Year from Other Sources Than Metropolitan Centers; Farmers and All Others Awakened to Vital Need of Solution to Haulage Problem Will Be Interested Visitors at 1920 Power Wagon Exhibition

IT is with a feeling of deep seated satisfaction that every one active in the development of the motor truck industry again will participate in its national shows for 1920. Whatever the causes which conspired to bring about the suspension of these stimulating trade functions, it is now generally conceded that the in and out practice which in the past has marked the holding of them has had the effect of publicly implying that the business of making and applying motor trucks was not sufficiently advanced to warrant continuous and uninterrupted sequence of such displays.

The public quickly catches the color of an industry from its practices. Unevenness of policy in such an important matter as the giving of national exhibitions may easily lead to the suspicion that all is not well. Better no shows at all than such irregularity as has characterized their presentation in the past.

There are two principal views on this question of motor truck shows. One is of a practical character, and the other a blend of the practical and visionary. Both are warmly defended by their partisans. The conservatives contend that receipts from admissions should balance expenses. They are only mildly in favor of promotive enterprise. The liberals stoutly assert that the heart of the show is its educational value. They believe that, by an assemblage of all products, the public can be convinced that the industry has the proportions and qualities needful for permanency. In their opinion national exhibitions are necessary in order to carry a message to the public which not even the direct application of motor trucks can convey.

Merely by observing street traffic one can gain no adequate impression of the huge volume of invested capital, the large number of manufacturing plants, the extent of the distribution system, and the other powerful trade elements which are revealed at shows. National exhibitions are tonic in character, highly instructive, and may safely be considered as a full grown expression of public desire.

It is a happy circumstance that in the conduct of the 1920 shows the educational development of visitors is not to be overlooked. The success of motor truck operation is as much due to administrative practices as to the efficiency of the mechanical units employed. From the conventions, lectures and discussions, which will be so marked a feature of this year's exhibitions, we may confidently expect there will develop an educational system and which will result in great advantages to the industry.

The final character of a motor truck exhibition is a matter which has often challenged the attention of exhibitors and visitors—whether it should be a collection of inanimate objects whose merits could be extolled by ardent salesmen, or whether it should, in addition, duplicate the lively scenes of commerce so far as practicable and, by such graphic means as the cinema, provoke a clearer understanding of motor truck economy. We are promised some instructive "movies" at the 1920 shows. The utilitarian characteristics of the motor truck and its auxiliary equipment will stand a lot of public exploitation. With proper organization it should easily be possible to attract large crowds to witness working demonstrations of the many curious economies which are to be gained by the application of motor trucks. These demonstrations, supported by explanatory talks and fortified by figures which prove their commercial value, would meet with general approval. To educate the mass to an appreciation of the full uses of motor trucks would be the highest service which the industry could accomplish through its exhibitions.

NATIONAL shows in the past have relied mainly upon the attendance which could be cultivated in metropolitan centers, upon the natural gravitation of motor truck dealers to such exhibitions, and the throng of people who have personal relations with the industry in the production of parts and accessories. This year a special effort is being made to secure the presence of the farmer and others in the rural regions who of late have manifested such a strong interest in the motor truck and trailer. If this can be accomplished the "gate" receipts need occasion no concern, for it is well known that the rural use of motor ecncern, for it is now realized that the rural use of motor trucks will ultimately be greater than the use of machines in urban centers.

It has been a good many years since motor truck shows have been given on such a scale as will characterize the exhibitions of 1920, and in the intervening period the industry has greatly expanded. A brief review of its physical proportions will indicate how firmly it is now

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established. The number of motor truck manufacturers now amounts to over 300. It is not worth while concealing the fact that of this number only about 90 are in production to such an extent as to lend luster to the industry. The remainder has potential capacity rather than great present active usefulness.

The total number of motor trucks manufactured in this country up to the end of 1919 amounts to about 742,000, valued roughly at $1,816,300,000. Of these about 76,000 have been exported, valued at about $18,000,000. A little more than 81,000 machines were absorbed in army service, and their value was about $2,700,000.

The impressiveness of these figures is perhaps better understood when it is stated that in the year 1904 the output was only 425 machines, valued at about $1,000,000. Motor truck production languished up to about 1910. In the following year, however, there was almost a 50 per cent increase in the volume of production, which in that year reached a little more than 11,000 machines. From that time forward production was vigorously sustained. The annual volume of factory output from 1912 to the present period was as follows:

Year	No. of Machines	Value
1912	24,650	$ 59,160,000
1913	28,900	67,915,000
1914	30,350	68,287,500
1915	67,225	151,256,250
1916	88,750	206,787,500
1917	128,157	294,761,100
1918	227,250	579,487,500
1919*	123,050	332,235,000

*These figures cover only the first nine months of the year 1919.

This remarkable development in production was accompanied by a corresponding development in agency distribution, until today about 15,000 motor truck dealers are more or less actively engaged in spreading the doctrine of motor truck economy. The size of this army of distributers seems quite a bit larger than is necessary to carry the product of the factories to the final buyer, but in this connection it should be remembered that not all who are registered as motor truck dealers are active in that capacity. A count of the concerns which release the bulk of factory product will probably not show more than 5,000 or 6000. A census would also show that not all of these concerns are exclusively engaged in the sale of motor trucks.

But perhaps the most noteworthy fact of present day conditions is the confidence which "fleet owners" show in the economic value of their equipment. This faith is accurately reflected in the huge sums of money invested in motor trucks by individual firms. Reckoning a "fleet" as five or more machines, it is calculated that there are about 14,000 concerns which are entitled to this rank. The number of machines in those 14,000 "fleets" is estimated at 97,000, and their value at about $269,000,000.

THUS it is quite apparent that the application of the motor truck is neither artificially cultivated, nor confined to specially selected spheres of use. On the contrary, its economy is widely recognized, universally encouraged, and indiscriminately applied. It is this that makes the outlook for the industry so brilliant—this and the fact that market possibilities are as yet but partially revealed because highways fit for the motor truck's use are pitiably few. Henceforward the market for motor trucks will probably expand in ratio as roads are built for their traffic. Up to date market has been developed in spite of, rather than because of, the prevalence of good roads. This is the proud boast of motor truck designers. But there is obviously, a limit to the absorption of product under such unnatural conditions as now generally prevail throughout the country.

The next five years will probably witness the construction of a great many miles of modern highways in every state in the Union, and when once this constructive policy is well under way, we may safely count upon a corresponding expansion in motor truck application. It is the fixed opinion in the world at large that wherever there are soundly made and soundly maintained roads there will be an ever increasing volume of motor truck transportation. until in the end this method of freight conveyance will eclipse all rival methods in popularity, promptitude of service and low cost.

The national shows of 1920 but emphasize this belief.

In the following pages will be found brief descriptions of all the motor truck models to be seen at the New York show together with a number of illustrations of machines.

Ace, 3½-ton model.

ACASON.—The Acason Motor Truck Company will continue its line of 1-, 1½-, 2-, 3½-, and 5-ton models throughout 1920. These models will not show any radical changes, the only improvements being in the way of refinements. Waukesha engines, Eisemann magnetos, Stromberg carbureters, Fuller clutches and transmissions, Timken axles, Detroit springs, Lavine steering gears and Savage frames are the well known standard parts that feature the Acason worm-drive motor trucks.

✠

ACE.—The American Motor Truck Company of Newark, Ohio, is manufacturing a ¾-1-ton, a 1½-2-ton, a 2½-3-ton, and a 3½-4-ton motor truck. The photograph of the 2½-ton chassis basically is representative of all Ace models. In other words, the basic design and principle of the various models is founded on the construction of the 2½-ton chassis and a great many of the parts, castings, etc., are interchangeable. In building Ace motor trucks, two ideas are being carried through, to meet the present and future motor truck markets. First, quality. The American company's claim to building highest grade motor trucks is based on the fact that the company engineered and designed its product after years of investigation, experience, comparisons, and by taking advantage of the mistakes made by other manufacturers. In building this product, the thought of price is secondary. The finest quality of material and workmanship is purchased, so that every detail of the product is engineered to unity and is as fine as modern ingenuity can make it. The second point is: The fully equipped motor truck. The Ace is a pioneer

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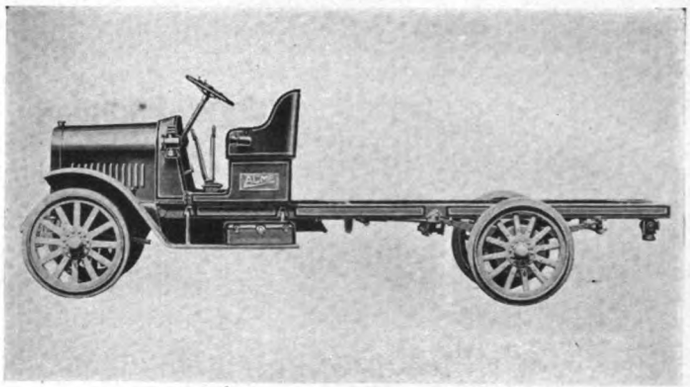
in this respect. The motor truck of the present, and of the future, must have an all-weather cab, electric lights, electric starter, steel bumper, radiator guard, steel wheels, odometer, electric horn, and all those other features which are essential to comfort, convenience, utility, economy and service.

✠

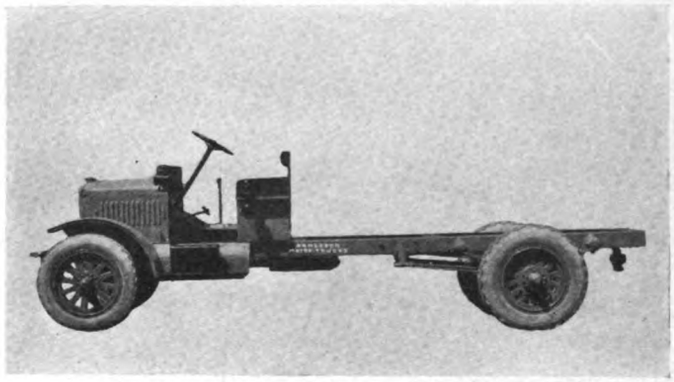
ACME.—The Acme Motor Truck Company, Cadillac, Michigan, has recently announced and put into production a new model. This will be known as model "F," capacity 1½-tons. The designing of this new model and the selection of its units were based on a careful analysis of the field and what is required of a 1½-ton motor truck. This new Acme model attains the same high standard found in all of the Acme models as to choice of units, design, assembly and proper balance. No effort has heretofore been made to produce an Acme 1½-ton motor truck owing to a Timken-Detroit 1½-ton axle not being manufactured. Since the announcement of Timken axle 6460, this being strictly a 1½-ton motor truck axle, it has made it possible for the Acme company to produce this new model and offer a well-balanced 1½-ton motor truck. Model "F" has a chassis rating including weight of body of 4,500 pounds; maximum on rear axle 80 per centum of body weight and load; wheelbase 141 inches; chassis length 208 inches over all; loading space 120 inches; 58-inch tread, and Continental Red Seal motor developing 35 h.p. While this model was designed primarily for the farm field, it is proving a favorite in all lines where a motor truck a little heavier than the 1-ton and not quite so heavy as the 2-ton is desired.



Acme F, 1½-ton.

✠

ARMLEDER.—Armleder Motor Trucks have in their construction well-known high-grade standard units. These alone, however, do not make a good truck; they only help to do it. These machines embrace six patented features owned exclusively by the company, and these, together with other striking mechanical construction features, combining simplicity, quick replacement and interchangeability of parts, are what make the Armleder a high-grade motor truck. It is these features, combined with the finest materials and workmanship, that raise the Armleder from an ordinarily good motor truck to a superfine one. They add to the efficiency of the motor truck and to its value. Armleder patented springs shorten from 12 to 17 inches under load, depending on the weight of the load, thereby adjusting themselves to the weight they must carry, giving flexibility and easy riding qualities. There are no shackles or shackle bolts. About 48 wearing parts are done away with. They are made of vanadium steel in every leaf and guaranteed never to break.



Armleder.

✠

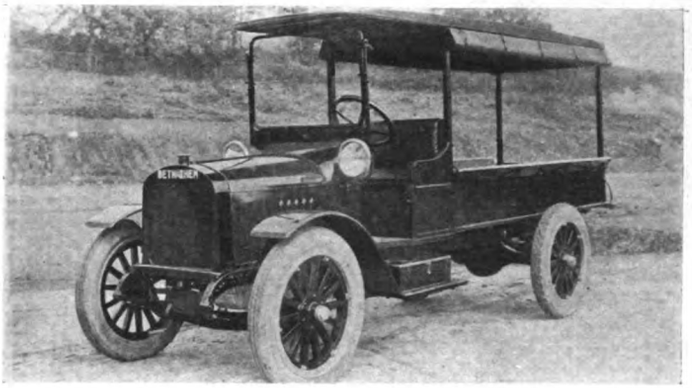
ATTERBURY.—Well known standard parts such as Continental engines, Long radiators, Eisemann magnetos, Zenith carbureters, Brown-Lipe clutches and transmissions, Timken axles, Gemmer steering gears and Savage frames will continue to feature Atterbury construction throughout the coming year. This worm-drive machine which is made in 1½-, 2-, 3½-, and 5-ton models will be on exhibit at both the New York and Chicago shows.

✠

AUTOCAR.—A new heavy-duty model Autocar of 18,000-pound total capacity will feature this company's exhibit at the New York and Chicago shows. Excepting for the Bosch magneto and Stromberg carbureter all parts of this machine are manufactured in the Autocar plant at Ardmore, Pennsylvania.

✠

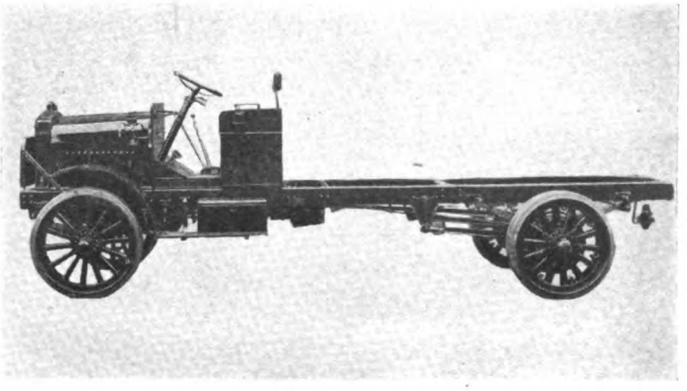
BETHLEHEM.—"The addition of the ¾-ton Dependable Delivery to the Bethlehem line," says Roy S. Davey, General Sales Manager of the Bethlehem Motors Corporation, Allentown, Pennsylvania, "gives every butcher, baker, retail grocer, department store owner, florist, milkman, farmer—anyone whose business requires speedy, reliable delivery, an edge on his competitor. The Dependable Delivery is a real motor truck built according to motor truck requirements by motor truck manufacturers for motor truck purposes. It is not an adapted pleasure vehicle. The Bethlehem is neither overbuilt to justify a price nor underbuilt to meet a price. It has all the power, strength and endurance of the bigger Bethlehem models. Its electric lighting and starting system means safety and economy, for the use to which a light delivery motor truck is put frequently calls for numerous stops and night work. If a driver can step on a button instead of turning over the motor by hand, he'll shut off the power whenever he stops—the advantage of powerful headlights needs no explanation. The starting feature alone is a guarantee of low operating cost—every merchant's aim. And add to low operating cost, low repair cost and reasonable initial cost. Standard specifications are: Electric lighting, electric starting. An especially designed Bethlehem motor Bosch magneto equipped. Bronze backed motor bearings. Spicer drive shaft. Bevel-gear rear axle. Ross steering-gear. Chrome vanadium steel springs. Semi-flexible frame. Meyers magazine oiling system. Cord pneumatic tires, 35 by 4½ front, 35 by 5 rear.



Bethlehem, ¾-ton.

✠

BROCKWAY.—This model takes the place of former Model K3 2-ton capacity and reflects the improvements obtained through experience in building strictly high-grade motor trucks for a period of eight years. The 1920 Model K4 2½-ton capacity follows the same general design as the 3½- and 5-ton capacities. The improvements in this particular model consist of deepening the Parish frame one inch; mounting a Brown-Lipe four-speed transmission on main frame support amidships instead of a three-speed sub-frame amidships; the adoption of Brown-Lipe dry-disk clutch in place of Hartford leather-faced cone; redesigning the radiator to provide larger cooling area and water capacity; adding military type radiator guard, together with skid chain hooks on rear wheel as standard equipment; adopting the Timken 2½-ton worm-drive axle in which the drive shaft is 1/16 inch larger in diameter, and with larger bearings than in the former 20-ton axle and having the differential splined instead of bolted into the worm wheel. The exhaust pipe has also been changed from flexible tubing to a bent steel pipe, and Continental model C2 motor is used in place of the C4. The front cross-member of the frame now constitutes the bumper in place of a wood insert previously used. The Brockway line for 1920 consists of 1½-, 2½-, 3½- and 5-ton capacities, all worm-drive.



Brockway.

✠

CLYDESDALE.—The 1-, 1½-, 2½-, 3½-, and 5-ton models of this worm-drive machine will be shown at both the New York and Chicago shows. Standard parts are used throughout and include units such as Continental engines, Bosch magneto, Zenith carbureter, Brown-Lipe clutch and transmission, Timken axles, Standard springs, Ross steering-gear and Parish and Beck frame.

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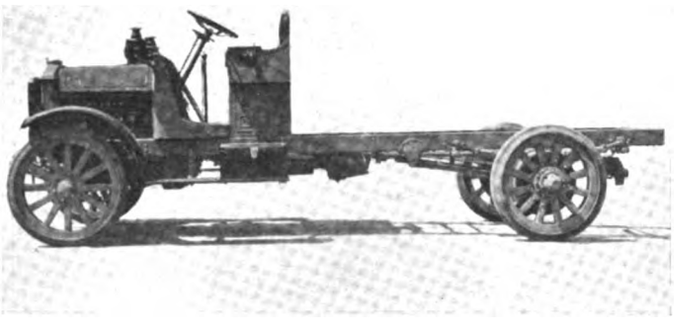
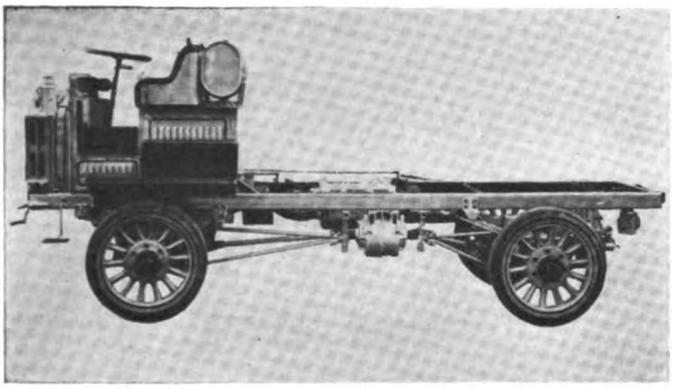
Commerce E P, 1½-ton.



Federal, Model TE, 1½-ton.



F. W. D., 3-ton.

Garford, Model 25, 1¼-ton.

COMMERCE.—It is not the policy of The Commerce Motor Car Company of Detroit to make any radical changes in the design of its motor truck. It will, therefore, except in minor instances, continue its present product through the 1920 season. Excepting in case of slight changes in accessories or adding conveniences no other changes are contemplated. This manufacturer of 1-1½- and 1½-2-ton motor trucks will continue its propaganda to furnish its equipment on pneumatic cord tires. The manufacturing plans have been greatly expanded. Much new manufacturing space is under construction and will be ready for occupancy in a few weeks. Two more acres of ground have been acquired at the present site where an additional building of two or three stories will be erected. The Commerce Motor Car Company manufacturers the 1-ton motor truck, which, with 35 by 5 pneumatic cord tires, allows a ½-ton overload capacity and a 1½-ton chassis, which, with 36 by 6 pneumatic cord tires, allows a ½-ton overload. The concern specializes by using high-class standard units and has a large range of bodies to select from, practically covering all uses for which its chassis is adapted. This is the company's tenth year of motor truck manufacture exclusively.

✠

CORBITT.—This motor truck, which will show at New York only, will continue throughout 1920 in the 1-, 1½-, 2-, 3½-, and 5-ton worm-drive models built up of such standard parts as Continental engine, Eisemann magneto, Stromberg carbureter, Brown-Lipe clutch and transmission, Sheldon axles and springs and Ross steering-gear.

✠

C. T.—The Commercial Truck Company of America will continue one model through 1920 which will show a number of important changes. The changes will include the Buda, model "WU" engine 3¾ by 5⅛-inch instead of the present motor, which is the North American. The tire specifications for both solid and pneumatics, have been enlarged. In the pneumatic tire equipment, nonskid cord tires will be used, 35 by 5-inch front, and 38 by 7-inch the rear. The truck equipped with solid tires, will have 34 by 4-inch front, and 36 by 6-inch the rear. The 1920 model will have a Ross left hand steering post, and a power tire pump, driven from the transmission, with hose, and pressure gauge, has been added to the equipment, also an impulse starter.

✠

DEFIANCE.—The Turnbull Motor Truck and Wagon Company, of Defiance, Ohio, has incorporated a number of improvements and refinements in its 1920 2-ton model which is of the internal gear drive type. Continental engine, Eisemann magneto, Stromberg carbureter, Borg and Beck clutch, Grant-Lees transmission, Torbensen axle, Standard springs, Ditwiller steering-gear and Detroit frames feature this year's machine.

✠

DENBY.—The Denby Motor Truck Company, of Detroit, will continue its 1-, 2-, 2½-, 3½-, and 5-ton models during 1920. This well known make of motor truck with its internal gear drive is built up such standard parts as Continental engine, Eisemann magneto, Stromberg carbureter, Fuller clutch and transmission, Russell axle, Detroit springs, Gemmer steering-gear and Detroit frame.

✠

DIAMOND T.—This well known worm-driven machine of Western manufacture will be shown at the New York show in five models: 1-, 1½-, 2-, 3½-, and 5-ton. Throughout 1920 Continental engines, Bosch magnetos, Stromberg carbureters, Brown-Lipe clutches and transmissions, Timken axles, Gemmer steering-gears and Smith frames will feature the sturdy construction of Diamond T's.

✠

DODGE.—The 1,000-pound delivery car made by Dodge Brothers, of Detroit, will be featured at the New York show. Power is furnished this machine by a special engine made by the makers of the car. Other parts are: Stewart carbureter, Detroit springs, Northeast battery ignition, own steering-gear. The final drive is bevel gear.

✠

DORRIS.—No radical changes are to be noted in the 2- and 3½-ton models of the Dorris Motor Car Company's machines for 1920. The company will continue to make its own engines and for other parts will use, Bosch magneto, Stromberg carbureter, Brown-Lipe clutch and transmission, Timken axle, Rowland springs, and Smith frame. The models are worm-driven.

✠

FEDERAL.—The Federal Motor Truck Company, of Detroit, making five models, 1-, 1½-, 2-, 3½- and 5-ton, will be represented at the New York show. This popular machine has won favor through the efficient performance of its many standard parts, which include: Continental engine, Eisemann magneto, Zenith carbureter, Berg & Beck clutch, Timken axle, Mather springs and Gemmer steering-gear.

✠

F. W. D.—This 3-ton veteran of heavy loads and roads will be on display and will seek to demonstrate why it won fame in the war. Its principal parts consist of Wisconsin engine, Eisemann magneto, Stromburg carbureter, Hele-Shaw clutch, Coto transmission, own axle, Tuthill springs, Ross steering-gear and Parish frame.

✠

GARFORD.—The Garford Motor Truck Company, of Lima, Ohio, during 1920 will concentrate upon the building of five models, namely, the 1¼-ton, 2-ton, 3½-ton, designed with the motor out in front, the 3½-ton of short wheelbase, designed with the motor under the cab, and the 5-ton. The 1¼-ton machine and the 3½-ton model with the motor placed in front are recent additions to the Garford line. The former is designed to meet all the requirements of light hauling in the industrial, commercial and farm fields. It is particularly adapted to work on the farm and the demand for it from this source alone has far exceeded its production to date. While virtually it is a 1¼-ton machine, it embraces the additional strength obtainable in a motor truck of 1½-ton capacity. It has a 1½-ton worm-drive Timken axle, a 1½-ton frame and its transmission is of the 1½-ton type. It is equipped with a four-cylinder "L" head motor 3¾ by 5⅛ inches. The new Garford 3½-ton model fills a popular demand for a motor truck of medium heavy capacity, low initial cost and capable of increased economy in both gasolene consumption and cost of main-

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tenance. The 1¼-ton model, although but a few months old, has assumed a place of leadership in the extensive Garford line. The demand from the farm field alone has to date exceeded its production. The pneumatic tires are extra equipment.

✣

GRAMM-BERNSTEIN.—The new 5-ton Gramm-Bernstein illustrated herewith is the basis of their new line of worm-drive motor trucks, which embraces 1½-, 2-, 2½-, 3½- and 5-ton capacities. The line includes also an internal-gear model of 1½-ton size. Of these the 2½-, 3½- and 5-ton are driven by the Liberty truck-type motor with removable cylinder heads. All worm-drive models are sold completely equipped, in accordance with the Gramm-Bernstein policy, with cab and ventilating windshield; radiator guard; motometer; radiator shutters; army towing hooks; hubodometer; electric side, dash and tail lights; metal license brackets front and rear; and spring trailer draw-bar with locking device at rear end. In addition they carry the other Gramm-Bernstein characteristics, such as the radiator shroud and shutter, patented wick oilers on all spring bolts and Gramm patented constant mesh transmission, with pad for attaching Gramm power take-off device. The 1½-ton internal gear has been added to the line to meet the demand for a strictly high-grade, well-engineered, light motor truck at a popular price. It is assembled from proved units, sizes of which are of ample dimensions.

✣

HIGHWAY TRAILER.—Made by Highway Trailer Co., Edgerton, Wisconsin, manufacturers of 2-ton, 3-ton, 5-ton and 10-ton capacity model trailers. The Highway line will be on exhibition at the New York Motor Truck Show. The Highway company has secured wide distribution and has had to double its plant to meet the increasing demand for its product. In addition to the above-mentioned models, the Highway company produces a full line of 4-wheel reversible trailers, semi-trailers and pole trailers ranging in capacity from 1 to 10 tons.

✣

HUFFMAN—The Huffman motor truck, made in two models "C" and "B," 2,000 to 5,500 pounds' capacity, is built up of all standard parts including Continental engine, Dixie magneto, Zenith carbureter, Fuller clutch and transmission, Torbensen axle in Model C and Standard axle in the worm-driven Model B. Perfection springs are standard equipment.

✣

INDIANA.—This machine, which is made by The Indiana Truck Corporation, Marion, Indiana, will be represented at the New York show in five sizes: 1-, 1½-, 2-, 3½- and 5-ton. In this line the 1- and 5-ton models are equipped with Waukesha engines, while the other models carry Rutenber engines. Other standard parts in the Indiana models are Eisemann magneto, Stromberg carburetor, Borg & Beck clutch, Brown-Lipe transmission, Sheldon axles and Wohlrab steering-gear.

✣

INTERNATIONAL.—The illustration shows the new 3½-ton Model L International Motor Truck, 160-inch wheelbase. This model is also manufactured with 185-inch wheelbase, which thus gives two new sizes to the International line. Model L is built along the same general lines of the other International models—8-inch pressed steel channel frame, four-cylinder, valve-in-head, water-cooled engine, dash radiator and sloping hood, multiple-disk clutch, four speed, selective transmission, International type internal gear final drive. International type auxiliary side springs. Solid tires are regular equipment, 36 by 5 front, 40 by 10 rear. All sizes of International motor trucks except the Model L sizes are now built regularly with standard 56-inch tread front and rear. Model G is also made with 61-inch tread, rear. Models G (2-ton), F (1-ton), and H (¾-ton) are now equipped with International type auxiliary side springs which is the spring construction always used on Model K (1½-ton) and on the new Model L. The dash design of Models F and H has been changed to the cowl type and altered slightly to provide for dash gasolene tanks. This standardizes the design of the entire line of International motor trucks into one general uniform type of construction, and all important International features are now embodied in each International model.

✣

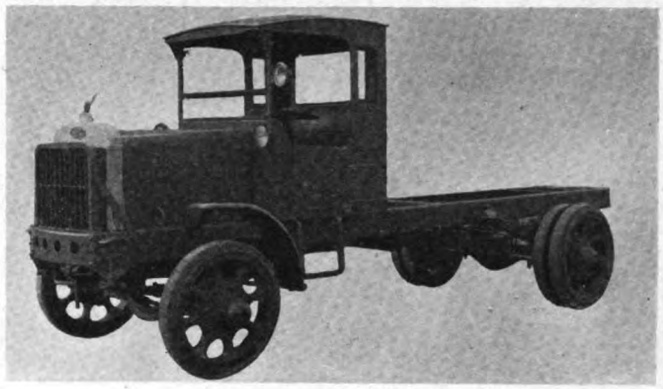
JUMBO.—The careful selection of material and more complete equipment which is going into motor trucks is clearly brought out in the three models of the Jumbo motor truck manufactured by the Nelson Motor Truck Company, Saginaw, Michigan. All models are Clark internal gear driven. A large number of newly designed features have been incorporated in these motor trucks. One of particular interest being the straight line drive which is secured by mounting the engine at an angle of 2 degrees 20 minutes on its base, thus allowing the crank shaft and the propeller shaft to be in straight line when the machine is under load. The mounting of the engine has been worked out with the engineers of the Buda company, which motor is used in all Jumbo models. Another feature of unusual interest in the 3½-ton model is the A-speed Brown-Lipe transmission, equipped with special apertures for power take-off installation. All models are equipped with radiator shutters. In heavy duty models a spring draw-bar attachment is standard equipment for the purpose of hauling trailers. Throughout, all Jumbos are lubricated by the Alemite grease gun system. A steel cab for the driver is standard equipment with the chassis. The Jumbo line includes motor trucks having 3000-, 4000-, 5000-, 6000-, 7000- and 8000 pounds capacity. Solid or pneumatic tire equipment is optional. All models are equipped with hub odometer.

✣

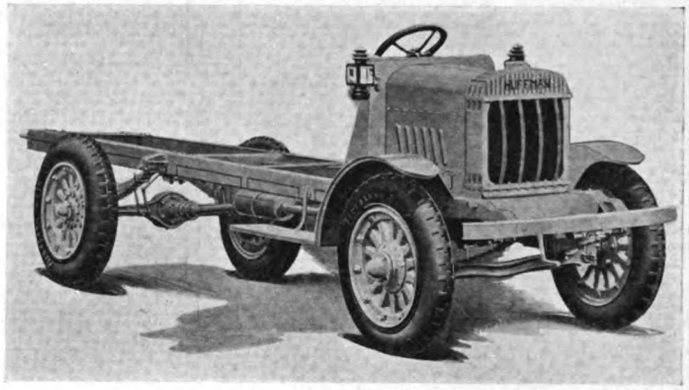
KELLY-SPRINGFIELD.—This line of well known motor trucks will occupy prominent space at the New York show where seven models will be on exhibit including two models of the 1½-ton and the 2½-ton and one model each of the 3½-, 4- and 5-ton. Kelly construction during 1920 will follow closely the models of 1919 which contained the following standard parts: Eisemann magneto, Rayfield carbureter, own clutch, Covert transmission, own axle, Perfection springs, Gemmer steering-gear, and own frame. Included in the Kelly models are both chain and worm drives.

✣

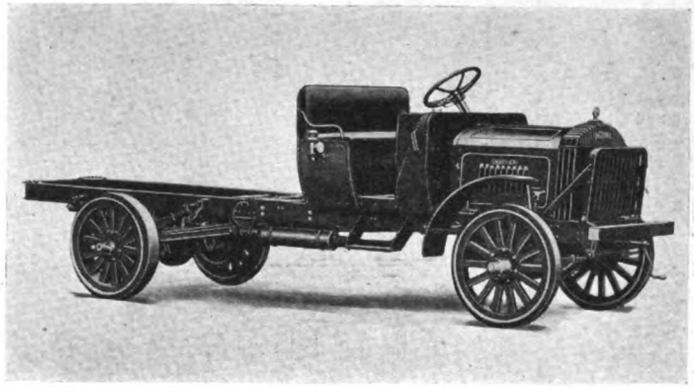
KEYSTONE.—The one model of the Keystone in 2-ton size will be shown at the New York show. This motor truck for all-around use is both solid and pneumatic tire equipped. It carries a Buda engine, Berling magneto, Zenith carbureter, Fuller clutch and transmission, Russel axle, and rolled channel steel frame.



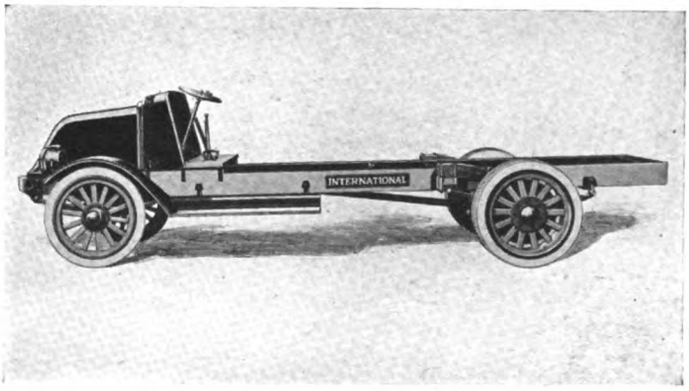
Gramm-Bernstein.



Huffman.



Indiana.



International, 3½-ton.

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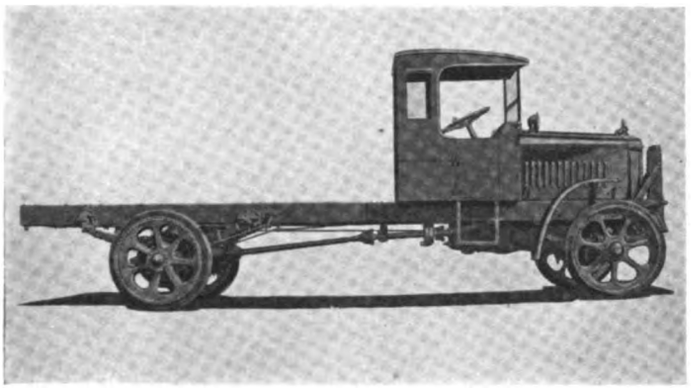
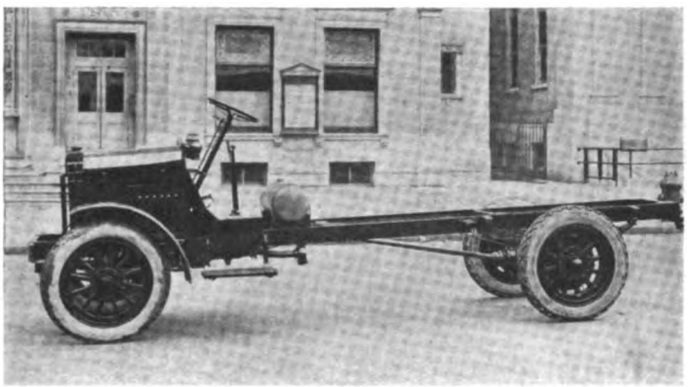
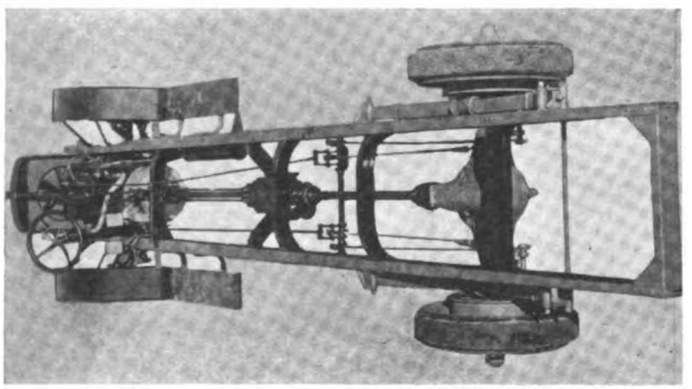


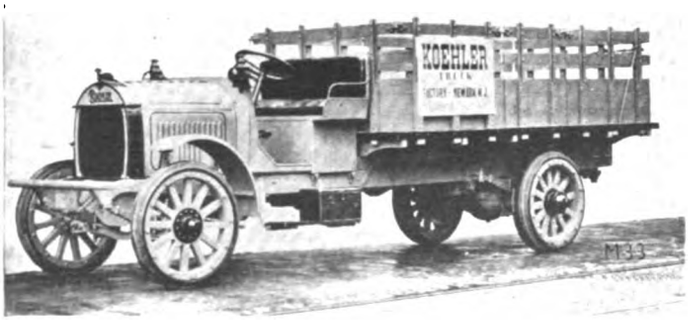
Jumbo, 3½-ton.



Keystone.



Kissel.



Koehler, 2½-ton.

KISSEL.—The Kissel ¾- to 1-ton model is for retailers and merchants who want a quick delivery machine for speedy work in city and suburban districts; for manufacturers and wholesalers who want a light motor truck as auxiliary to their heavier models; for farmers who want a reliable light delivery machine equipped with a good loading space and ability to carry loads at a good rate of speed and for owners who require motor trucks for emergency runs. The 1½-ton size is for those who demand a machine larger than the light delivery car and still want a speedy vehicle for delivery service. Then there are those concerns that have use for the 2- and 2½-ton models such as local transportation and express companies, rural motor express, road builders, contractors, excavators, municipal work, farmers, manufacturers, wholesalers, coal and wood dealers. There are still other concerns that require a model around the 3½-ton size, such as contractors, road builders, express and moving companies that specialize on heavy haulage work, as well as all those industries and manufacturers that require a powerful motor truck with the capacity and loading space suitable for work in connection for hauling lumber, stone, iron, brick, machinery, gravel, cement, materials for street paving, bridge work, as well as street sprinkling, flushing and oiling units. All these models are to be found in the Kissel line.

✠

KOEHLER.—This entirely new Koehler, designed by C. D. Peterson, will be seen at the New York Truck Show for the first time. Model "M" is the result of several years of tests by Mr. Peterson and the company estimates eight years of efficient service for this model as against the conventional five. The engine, a 35-h.p. Koehler-Hercules, is described as an exceptionally fine unit. Specifications of the engine and other principal parts are: Zenith carbureter; Eiseman high-tension magneto; Simplex "grid-valve"; solid-shaft driven governor; Brown-Lipe ten-plate dry-disk type clutch; Brown-Lipe four-speeds forward and reverse gear set; Spicer universal joints; Timken-David-Brown worm-drive rear axle; Parish and Bingham frame; Koehler armored radiator; Mather chrome-vanadium steel springs; Lavine steering and Wayne wheels. The power plant has three-point suspension. Quick accessibility of all parts is a point to which Mr. Peterson has given special attention. In the lubrication also there are new features, automatic oiling being provided for parts ordinarily neglected. The usual grease cup is missing. Specially designed oil reservoirs, some containing several months' supply, furnish lubrication for various parts, and tubular members also are utilized as oil reservoirs. The H. J. Koehler Company is building a new factory at Newark, New Jersey, to care for increased production. Other Koehler models are: Model C, 1¼-ton; Model M, 2½-ton, and Model MT, 5-ton road tractor.

✠

MACCAR.—A new Maccar known as Model "S" of 1-ton capacity will feature this company's exhibit at the show. This model is built in duplicate of the heavier Maccar machines only smaller units being used. This model incorporates all the leading features of the other models such as radius rods and the demountable power plant. It is equipped for both pneumatic and solid tires. Five models will be shown, 1½-, 2½-, 3½- and 5½-ton.

✠

MASTER.—The various models of Master motor trucks have proved so satisfactory that few changes will be seen during 1920. The only changes so far decided upon are, first, the standardization on Spicer universal joints throughout the entire line; and second, the adoption of a new steel dash on all models. The standard units which have characterized Master construction in the past will be seen in the 1920 chassis. These include Buda heavy-duty motors, Timken axles and bearings, Brown-Lipe clutches and transmissions, Ross steering gears, Parish & Bingham pressed steel frames, and Detroit Steel Products Company silico-manganese steel springs. It is Master policy to bring out improvements from time to time as they seem to be justified, rather than to hold them back and show entirely new models at the beginning of the year. For this reason, a number of small improvements now contemplated will probably be seen during the early spring months rather than at the January shows. These improvements will not materially affect the standard Master design or construction. A complete line, including 1½-, 2-, 3½- and 5-ton models, also a 6-ton road tractor, is now produced, and a 7½-ton model will probably be brought out within the next few months. The chassis shown here is characteristic of Master design.

✠

MAXWELL.—The chassis is furnished with complete dash fittings, upholstered driver's seat of full width; electric horn; generator; 80 ampere hour storage battery; and a full set of tools. The two great improvements evident in the motor this season are the "hot spot" and the "ram's horn" manifold. The "hot spot" cracks up the low-grade commercial gasolene into hot, dry gas instead of allowing it to pass in a raw state to the cylinders, while the "ram's horn" manifold is scientifically designed to take care of the correct distributor of the gas mixture after it has been prepared by the "hot spot." These features are equally important at all seasons of the year, but the benefits are more noticeable in cold weather because "hot spot" makes it possible for the motor to operate smoothly and powerfully without the slightest delay even in the coldest winter weather. Maxwell service records show that after more than 14,000 of these motor trucks had been in service for periods varying from a few months to 2½ years that they average 99.99 per centum perfect, a record based on the complaints and the quantity of repair parts required to keep them in good condition.

✠

NASH.—Three models of the Nash will be on exhibit at the show, the 1- and 2-ton internal-gear drive machines and the 2-ton Nash Quad. In the internal gear driven models are to be found Nash engines, Eisemann magnetos, Stromberg carbureters, Borg and Beck clutches, Detroit transmissions, Clark axles, Jacob steering-gears, and Smith frames. A Buda engine is used in the Quad, together with Nash transmission and axle, Mather springs and Lavine steering-gear.

✠

OLDSMOBILE.—The Oldsmobile Economy Truck was designed and built with the idea in mind of furnishing dependable and inexpensive transportation for many different lines of activity; serving equally well the merchant, the tradesman, the producer and the shipper. While sturdy and strong enough to carry capacity loads in

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work heretofore done by heavier machines, it is sufficiently light and speedy for city service. The standard body is express type, with top and side curtains. A standard metal cab is also furnished and a large variety of bodies can be mounted behind this cab. Chassis only is also supplied. Large pneumatic cord tires 35 by 5 are regular equipment, and Oldsmobile completeness is typified by regularly equipping the Economy Truck with an electric system furnishing current for ignition, starting, lighting and warning. The motor is of the valve-in-head type, developing over 40 horse-powerr by actual block test. The lubrication is a combination of force feed and splash. The rear axle is the Oldsmobile-Torbensen internal-gear drive. The load-carrying member is an I-beam steel forging, insuring great strength with relatively light weight. The frame embodies unusual strength. Wheels are of the artillery type, with demountable rims. Transmission is selected sliding type, three speeds forward and reverse.

✠

ONEIDA.—The national shows will bring before prospective motor truck purchasers for the first time the new Oneida models of gasolene-propelled motor trucks and the new Oneida unit-drive electric truck. The new gas models which will appear in five sizes—from 1¼- to 5-ton capacities—are a decided departure both in construction and design, from the present Oneida production. Notwithstanding their oversize dimensions and capacity for heavy work, the new Oneida models are faster, more flexible and perform with an ease and smoothness which resembles that of a pleasure car. All units in the new models are factory design and bear the Oneida trade-mark, the company having discontinued entirely the use of the units used in the present line. In the 5-ton job which is illustrated here the Oneida engine is an overhead valve type with mechanism enclosed, tappets and rocker arm bearings, lubricated by pressure oil feed—three-point suspension. Very great features of convenience, accessibility, and an unusual attention to motor truck speed will be found in all the models making up the new and complete line offered by the Oneida Motor Truck Company, Green Bay, Wisconsin. The new models are A9—1¼-ton; B9—1¾-ton; C9—2¼-ton; D9—3½-ton and E9—5-ton.

✠

PACKARD.—Pneumatic tired motor trucks, designed to meet the demand for greater speed and wider range in motor truck transportation, are announced by the Packard Motor Car Company for 1920 production. These new models are the first pneumatic tire machines to be manufactured by the Packard company, and are distinct in design from the solid tire models. They are built in three different sizes, giving a large range in capacity. The fact that they are specifically designed for pneumatic tires is considered a long step in the application of the motor vehicle to special work. A recent statement of the company says, "The pneumatic tire when put on a wheel intended for a solid tire gives a much larger wheel diameter, increasing the gear ratios heavily. The consequence is rapid engine deterioration because the engine is laboring constantly. The problem has been one of design rather than adaption. The pneumatic motor truck models are specifically designed for the work they do."

✠

PAIGE.—The Paige machines in 2½- and 3½-ton models using the following standard parts will be shown at New York: Continental engine, Bosch magneto, Stromberg carbureter, Brown-Lipe clutch and transmission, Timken axle, Perfection springs, Jacox steering gear and Parish frames.

✠

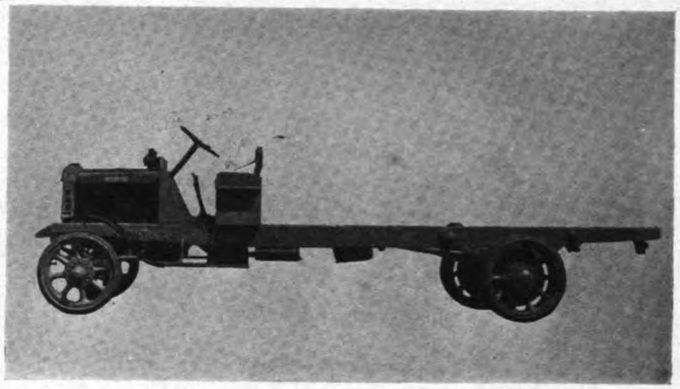
PIERCE-ARROW.—Recent improvements in the current Pierce-Arrow models include ratchet grease cups, oil pressure gauges on dash, hub odometer on left front wheel, foot accellerator now located at right of brake pedal, flexible glass windshield with rain vision cleaner now standard. The clutch has been made dustproof by close-fitting oil-retaining ring. The ball bearings on throw-out collar have been replaced by thrust bearing as on passenger car construction. The engine oiling is now done under pressure, the oil being carried in a crankcase pump, as on passenger cars. Increased oil pressure has caused the elimination of troughs in the crankshaft and connecting-rod bearings; oil grooves are used and bottom piston ring omitted. The water pump has been moved forward, allowing a special lighting generator installation without any difficulty. To insure better low-grade fuel carburation a new carbureter is used together with intake manifold with water connection to radiator. Changes made in the drip pan provide easier access to the under side of the engine and transmission. The transmission is of the three-speeds-forward type and the improvements include a countershaft extension facilitating power take-off arrangements. Improvements in the already comparatively easy steering include a 19-inch diameter Bakelite wheel, a greater reduction in worm and nut and a larger clamping bolt at the bottom.

✠

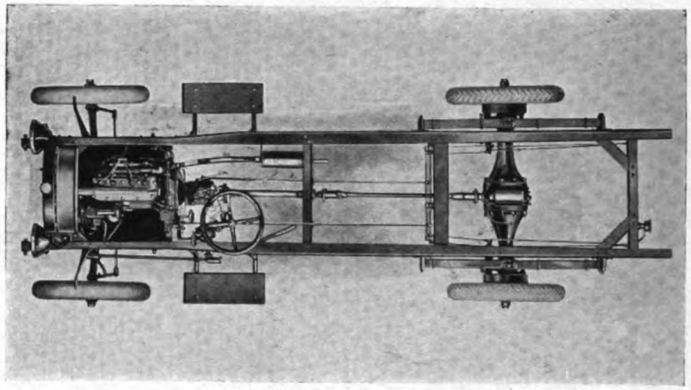
RAINIER.—The 1920 models of the Rainier Motor Corporation differ only in minor respects from those put out during 1919. As heretofore, this company specializes in the lighter tonnages. There are four sizes, having respectively carrying capacities of ¾-, 1-, 1½- and 2-tons. All models have Continental motor, Brown-Lipe clutch and transmission, and worm-driven rear axle. The ¾-ton has the Timken rear end, while the other models have Sheldons. All are fitted wtih Zenith carbureters, Monarch governor and magnetic ignition, either Simms or Bosch, optional. The gear set and motor are mounted as a unit power plant, the 2-ton chassis having the Model 30 Brown-Lipe transmission, while the other sizes have the Brown-Lipe Model 25. Thermo-syphon cooling is used throughout, with a sheet metal radiator and fan. Hotchkiss drive is employed on all models in conjunction with double safety spring shackle on the rear springs. The ¾-ton model enjoys the distinction of being the only worm-driven type of this size on the American market. It has always been the aim of the company to manufacture in the lighter sizes as good a vehicle as the leading American heavy-duty motor trucks are acknowledged to be in their class. Rainier chassis are thoroughly standardized, being composed of the best units obtainable, and constructed according to the modern engineering practices. A full line of stock bodies is carried in various styles, both open and closed.

✠

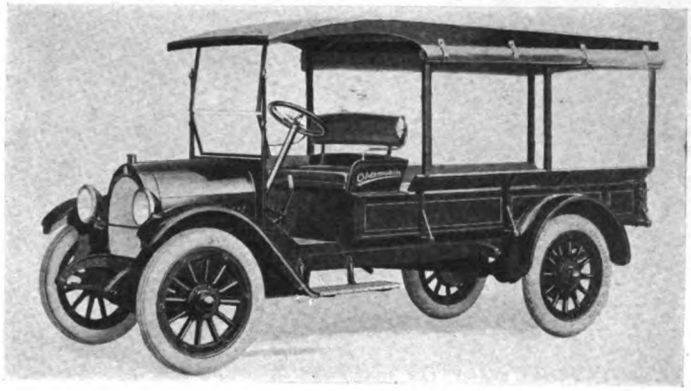
REO.—The 1,500-pound spur-gear driven "Speed Wagon" will be on exhibit at New York. This machine is made up of a Reo engine, Remy magneto, Johnson carbureter, Reo clutch and transmission, Reo axle, Penn springs, Reo steering-gear and frame.



Master, 5-ton.



Maxwell, 1½-ton.



Oldsmobile.

Oneida E9, 5-ton.

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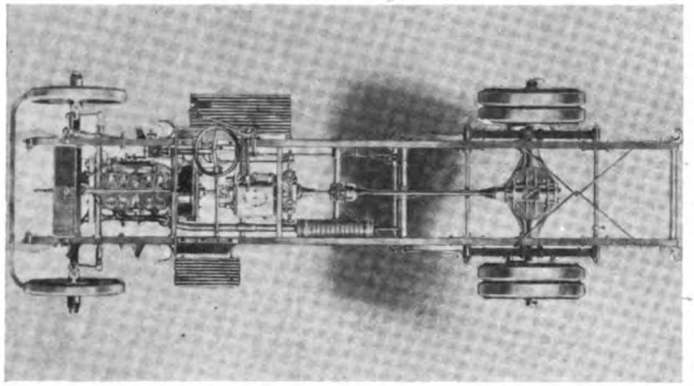
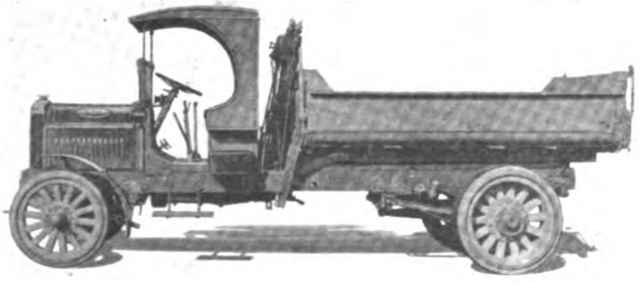
Packard.



Pierce-Arrow, 5-ton.

Rainier.



Schacht 10-speed, 5-ton.

REPUBLIC.—Four internal gear driven Republics, 1-, 1½-, 2½-, and 3½-ton, using a Continental engine, Eisemann magneto, Stromberg carbureter, Fuller clutch and transmission, Torbensen axle, Mather springs, Jacox steering-gear and Savage frame, will make up the display of this company at the New York show.

✠

ROWE.—Models of this machine in four sizes, 2-, 2½-, 3½-, and 5-ton, using the following well known standard parts, will be shown at New York: Wisconsin engine, Bosch magneto, Zenith carbureter, Brown-Lipe clutch and transmission, Sheldon axle and springs, Ross steering-gear and own frame.

✠

SANDOW.—Five models of the Sandow will be continued throughout 1920, the 1½-, 2-, 2½-, 3½ and 5-ton. The changes in these models are not marked, following well established practices in refinement only. Standard parts are used as follows: Continental engine, Bosch magneto, Stromberg carbureter, Brown-Lipe clutch and transmission, Timken axle, Garden City springs and Ross steering-gear.

✠

SANFORD.—Worm-driven Sanfords in 2½-, 3½-, and 5-ton models using standard parts construction throughout will be shown at the New York show: Continental engines, Bosch magneto, Stromberg carbureter, Borg and Beck clutch, Warner transimssion, Sheldon axle, Perfection springs, Ross steering-gear and Parish frame.

✠

SCHACHT.—This 5-ton model is representative of the entire Schacht line which also includes 2-, 2½- and 3½-ton capacities. The 10-speed transmission, however, will only be incorporated in the 3½- and 5-ton sizes; a regular 4-speed transmission is to be employed in the 2- and 2½-ton jobs. The general chassis design in the 1920 models will be the same as the 1919 models, although a number of refinements have been made towards simplifying and making the chassis construction more accessible. The clutch and brake pedals, together with connections, are now mounted on a single shaft which can be removed as a unit when necessary, greatly expediting the making of any repairs or adjustments. The service brake will be mounted directly in back of the transmission and at the forward end of the front propeller shaft, instead of at the rear end of the front propeller shaft as in the 1919 models. In addition to the 10-speed transmission on the 5-ton chassis, a larger Buda engine will be used having a bore of 4½ inches and a stroke of 6 inches. The 5-ton motor truck with 10-speed transmission is capable of attaining a speed of twenty to twenty-five miles an hour on high gear over good, level roads at an engine speed of 1,000 r.p.m. The use of the 10-speed transmission with its wide range of gear reductions will not only permit a high rate of vehicle speed when conditions justify, but also provides tremendous pulling power on the lower gears, enabling the motor truck to negotiate any kind of a road or grade where the wheels can secure traction.

✠

SCHWARTZ.—This internal gear drive motor truck in three sizes, 1½-, 2½-, and 5-ton, using the following standard parts, will be on exhibit at the New York show: Buda and Continental engines, Bosch magneto, Stromberg carbureter, Brown-Lipe clutch and transmission, Torbensen axle, Rowland springs, Ross steering-gear and Parish frame.

✠

SELDEN.—The Selden "A" series motor trucks have been designed and built to meet the conditions as the user finds them. The keynote then is flexibility. The actual manufacturing of the models was not started until the motor trucks had been given rigid tests in actual service—they are tried and proven, built for work. The 3½ A model will serve as an example of these flexible, in-built quality motor trucks. Features of the chassis are the full flexible frame, the flexible mounting of all units, the absence of all rivets, amidship transmission designed for all types of power take-off and new flexible radius rods, special over-size clutch and a general refined chassis with the careful consideration for long life installation. The engine is the Continental model E-7, 4½-inch bore, 5½-inch stroke. The clutch is a special design made by the Brown-Lipe Gear Company. It is fitted with a greater number of plates than used in standard practice to give long life and stand up under abuse. To increase the life of motor trucks and to obtain the best safe braking action, a differential equalizer is installed in both the foot and emergency brake lines. Through this equalizer an equal pull or pressure is exerted on both wheels at the same time. Another point of in-built quality.

✠

STANDARD.—The parts from which this motor truck is made are all that its name implies and are standard in every respect. The three sizes, 2-, 3½- and 5-ton, are fitted with Continental engine, Eisemann magneto, Stromberg carburetor, Brown-Lipe clutch and transmission, Timken axle, Ross & Gemmer steering-gear. The parts in the various models with but very few exceptions are the same.

✠

STERLING.—The Sterling motor truck in five sizes, 1½-, 2½-, 3½-, 5- and 7½-ton, will be shown at New York. Standard parts are used in this machine which give to it its sturdy construction. A Sterling engine is used together with Eisemann magneto, Rayfield carbureter, Hele-Shaw clutch, Sterling transmission, Timken axle, Mather springs and Sterling frame.

✠

STEWART.—The Stewart 2,000-pound delivery truck is a machine made to meet a popular demand. It is not a remodelled passenger car, but designed from the ground up as a motor truck, by expert motor truck manufacturers who have demonstrated their ability and the quality and economy of their product. Merchants, publishers and farmers have created the demand for this motor truck. No solid tires to rattle the car and the goods to pieces; it travels on five-inch cord tires and is intended for quick delivery runs—to get there and get back, and for the heavier hauling from depots and warehouses. Because good drivers are scarce and high-priced, this new Stewart is made to humor them; it has electric

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starter and electric lights. It carries out the Stewart policy of simplicity—all useless parts eliminated. It will prove its value in muddy and sandy country, as well as city streets. It will make business hum. The Stewart 1-ton delivery truck is built in both open and covered-express models. It is built on the same principles as the 3½-ton Stewart, only smaller. In addition to electric starter, electric lights, and five-inch cord tires, it embodies the following features: real truck rear axle, cast tank radiator, front bumper, rebound plate on all four springs, upper windshield swings for rain vision, lower for ventilation, oilless bushings and few grease cups, completely equipped at a popular price to be announced at New York show.

✣

SULLIVAN.—The 1½- and 2-ton models will be continued throughout 1920 and will be on exhibition at the New York show. Many refinements mark the 1920 Sullivans. Standard parts are used as follows: Buda engine, Bosch magneto, Stromberg carbureter, Brown-Lipe clutch and transmission, Timken axle, Sheldon springs, Ross steering-gear and Savage frame.

✣

TRAILMOBILES.—Trailmobiles are made in four-wheeled, Semi-Trailermobile and pole types. This chassis is that of a model 5-ton reversible type. It is built throughout according to the best standards of motor truck construction, but without motor or transmission assemblies. The chassis consists of a frame assembly and two interchangeable axle assemblies attached to the frame by semi-elliptic springs. The steering mechanism is carried on the axle and the drawheads on the frame. The automobile type of steering control is used, making it possible for the trailer to follow the motor truck exactly in turning a corner. The pivoted type of drawhead permits the trailer to be backed around a corner. The drawhead at either end may be used for steering, as occasion may require. Heavy automobile type of construction throughout makes these Trailmobiles almost unbreakable when used with their proper loads. Every moving part is provided with bushings and grease cup lubrications. Every wearing part is replaceable, giving each Trailmobile shown a practically unlimited life. This model M Trailmobile shown is made to carry a pay load of 5 tons with a body allowance of 1800 pounds. The wheelbase is 86 inches, and the tread of the wheels from center to center 70 inches. It is equipped regularly with 36 by 7 inch solid tires.

✣

TRANSPORT.—The Transport Truck Company, Mount Pleasant, Michigan, will make no radical changes in its 1920 production. However, many refinements and conveniences for the operators have been added. All 1920 Transports will be equipped with new aeroplane control system for gas and spark. This insures absolute accuracy in the position of spark and gas throttles and eliminates all rods and joints used in former construction. The position of the brake and clutch has been changed to aid the comfort of the driver. Changes have also been made in the design of the gas tanks and fittings, and hoods and fasteners have been improved. Hot-spot intake manifold, impulse starter, motometers, and hub-odometers are regular equipment on all Transport models. A new model of 3½-tons capacity is now under construction and will be called Model 70. This model will complete the Transport line for 1920. The Transport Truck Company has just moved and is now operating in its big, new daylight factory, which has a capacity of fifteen motor trucks per day, and plans have just been completed whereby this production will be increased to thirty machines per day by August first.

✣

TRIANGLE.—The Triangle motor truck in two models, 1½- and 2-ton sizes will be shown at the New York show. This machine is built up from such well known standard parts as Rutenber engine, Eisemann magneto, Stromberg carbureter, Fuller clutch and transmission, Clark axle, Detroit springs, Gemmer steering-gear, and Mason frame. The Triangle is internal-gear driven.

✣

UNION.—The Union motor truck in 2½- and 4-ton sizes will be continued during 1920. These models will be on display at the New York show where their standard parts construction will be shown to advantage. Wisconsin engine, Eisemann magneto, Schebler carbureter, Fuller clutch and transmission, Torbensen axle, Mather springs, Ross steering-gear and Smith frame make up the Union's more important parts.

✣

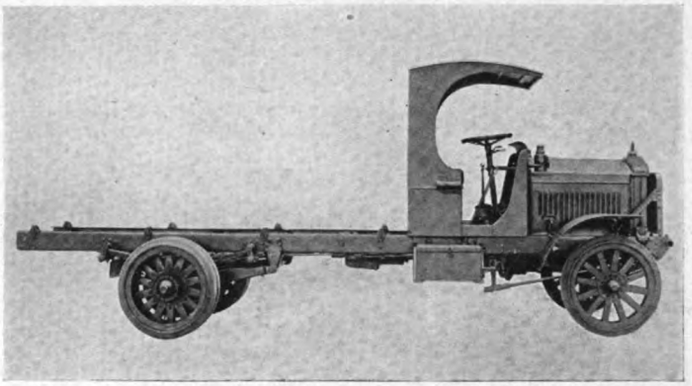
VELIE.—A new 1½-ton motor truck has been added to the 1920 Velie line and the former 2-ton model discontinued. For the coming year Velie motor trucks will be furnished in two sizes, the 1½-ton at $1925 for the chassis and a 3½-ton heavy-duty motor truck at $3950. Ten years' experience in motor truck building has convinced Velie that the average merchant, whether in city or country, finds greatest use for a 1½-ton machine. This is true of the general merchant, the implement dealer or the transfer man. In fact, many manufacturers prefer the quick action of numerous 1½-ton models to the slower service of machines several times heavier. The farmer also needs a 1½-ton motor truck; anything smaller than that is too light for his work and will not carry a body large enough to handle the diversified farm loads efficiently. Then there is the demand for heavy-duty motor trucks, such as tipping trucks for contractors' work, large van bodies, wholesale houses and heavy hauling of all kinds which are met successfully by the Velie 3½-ton machines, of which model thousands are now in daily use. Both models are of well-known Velie quality, furnished in several wheelbase lengths and all body styles.

✣

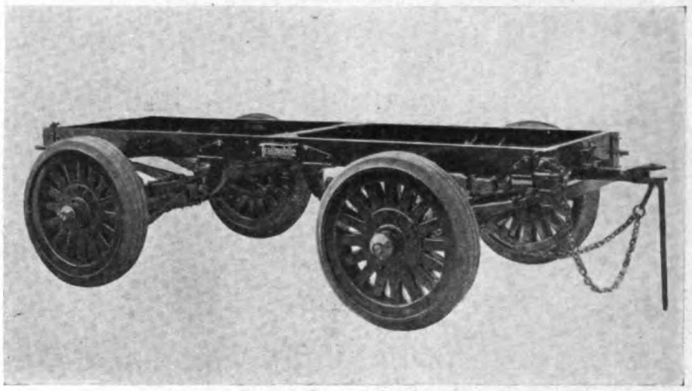
VIM.—The worm driven Vim with its Hercules engine, Dixie magneto, Zenith carbureter, Brown-Lipe clutch and transmission, Sheldon axle and springs, Gemmer steering-gear and own frame will be shown in four sizes at the New York show. The capacities of the Vim are: 1-, 2-, 3-, and 5-ton.

✣

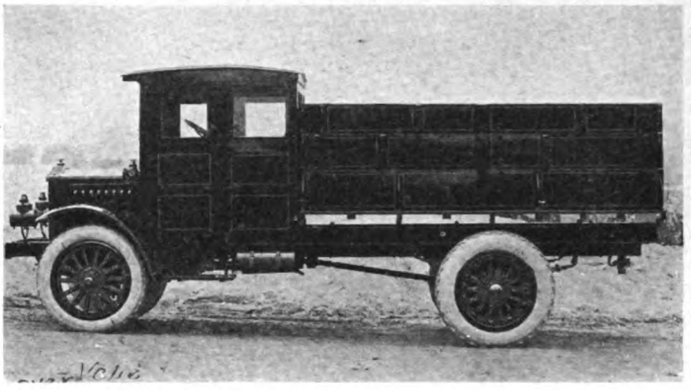
WALKER ELECTRIC.—Improvements in the Walker Vehicle Company's product are to be noted as follows: Chassis frame changed from rolled to pressed steel channel; bumpers changed from cast steel to larger pressed steel type for better protection of cab and driver; seat box enlarged to full size with angles for



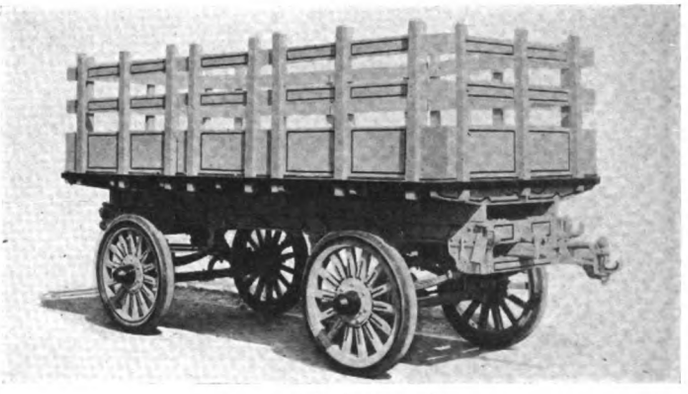
Selden, 3½-ton.



Trailmobile.



Velie, Model 46, 1½-ton.



Warner, 4-wheel trailer.

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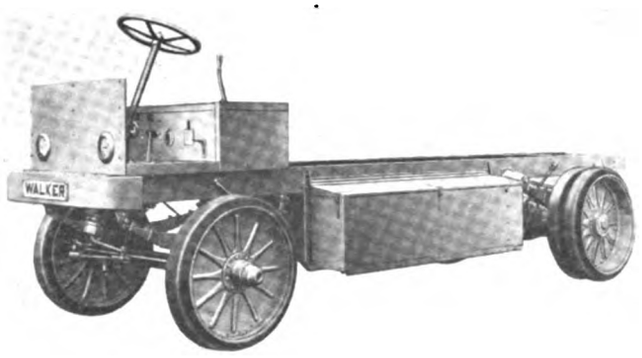
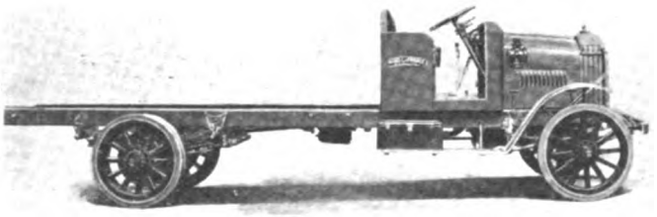
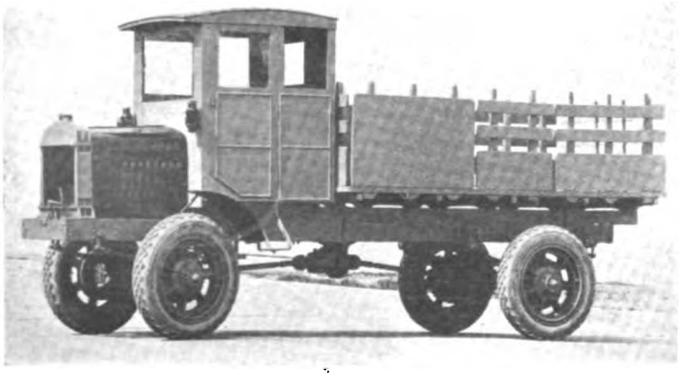


Walker Electric.

Ward W S, 750-pound.



Ward La France, 2½-ton.



Winther, 1½-ton, all-wheel drive.

attaching to cab; floor boards and dash furnished with dash lamps installed and wired complete; size of power wiring increased for higher efficiency. Models for 1920 Walker electric road truck chassis —½-, 1-, 2-, 3½-, and 5-ton load capacity. Walker electric road tractors, Model No. 3 for hauling trailers, capacity 15 tons gross trailing load; Model No. 5 fifth-wheel type for hauling two-wheel trailers, capacity 10 tons gross trailing load; Model No. 7, crane type, for loading and hauling trailers, hauling capacity 15 tons gross trailing load, lifting capacity 2 tons.

✣

WALTER.—The 3½-ton Walter, upon which the Walter Motor Truck Company, of New York City, specializes, will be shown at the New York show. This machine is driven by a Walter engine and has for its standard parts: Swiss magneto, Zenith carbureter. Other parts are made in the Walter factory.

✣

WARD.—The type WS to be shown at the coming show will be a worm-drive instead of the worm-bevel which has been used heretofore. This will completely unify the Ward line, all models henceforth being worm-driven. As special and patented features of especial interest in connection with Ward motor trucks attention is called to the front entrance construction, consisting of combination bumper step and divided dash or divided windshield in case full enclosure is used. This construction has a broad, oval-shaped wood (iron-bound) bumper which is so mounted and supported forward of the front goose-neck as to serve also the purpose of a step by means of which entrance to the vehicle is obtained through a swinging half dash that may be bolted or locked in either a driving or operating and working position. When driving to the route, the dash extends across the entire front of the vehicle. Upon reaching the route, the bolt is withdrawn, and the dash swung about its vertically hinged center line to a point 180 degrees from the full dash position. In this new position, it is locked by means of the same bolt so that entrance and exit is easily obtained by means of this half dash opening in combination with the bumper step. Other models to be exhibited at the show will be the WA, 1,250 pounds; WB, 2,000 pounds, and WD, 4,000 pounds.

✣

WARD LA FRANCE.—This company is bringing out three new models for 1920. They will be known as Models 2B, 2½-ton, 4A, 3½-ton, and 5A, 5-ton. The 2B and 4A will take the place of the 1919 models 2A and 3½A respectively. The model 5A is an entirely new addition to the line. The most important improvement in the 1920 line is the incorporation of an extra large capacity engine in all models. A 4⅜ by 5¾ inch will be used in the 2B, a 4½ by 6¼ inch in the 4A and a 5 by 6¾ inch in the 5A. (You will note that these are exceptionally large sized motors for the capacity of the motor trucks. This feature in connection with the high gear ratios will permit of maximum road speed of machines at minimum r.p.m. of engine. This eliminates the usual necessity of speeding up the engine to obtain the desired horse-power and consequently does away with excessive vibration which makes for a long and economic life of engine and all other running parts. Motors on all models are of the most modern type, having the cylinders cast in pairs, removable heads and full force feed oiling system. All motors are also equipped with self-contained, centrifugal type, positive direct connected governors. All models have automatic live oil lubrication in which the oil is conducted by wicks to the different bearings in shackles, radius-rods and other moving parts of the chassis.

✣

WILSON.—Power wagons of this well known make will be built during 1920 in four sizes, 1-, 2-, 3½-, and 5-ton. Changes in construction are not marked but the refinements are many. Standard parts are used throughout the construction of all Wilson motor trucks as follows: Continental engine, Eisemann magneto, Marvel carbureter, Hartford clutch, Covert transmission, Timken axle, Perfection springs, Ross steering-gear and Lackawanna frame. Wilsons are worm-driven.

✣

WINTHER.—The 1920 Winther models will be practically the same as the 1919 chassis with the exception of refinements in some of the units used. Wisconsin motors, for example, which are now standard equipment for all Winther motor trucks, are much more accessible because of the new type of detachable cylinder head, and the force feed method of lubrication is made more effective by bolting the oil pump to the upper section of the aluminum crankcase. Disk metal wheels are regular on every model replacing the spoke type on the 2-ton motor truck, and the rear axle will be one piece instead of the three-piece riveted section previously used, giving a stronger and more compact construction. On the front axle of 1½-ton four-wheel drive the steering knuckle bodies will have bushings to afford protection for both the steering pin and knuckle. The 1920 Winther models will include 1½-, 2-, 3½-, 4-, 5-, 6- and 7-ton chassis in the rear-driven type and 1½-, 2½- and 3½-ton four-wheel drives.

✣

WARNER TRAILERS.—Warner Trailers are made in four types, four-wheel heavy duty truck trailers, semi-trailers with the Warner fifth-wheel, two-wheel trailers with swivel bolsters and auto trailers. There are four sizes of the four-wheel type, 1½-ton, 2½-ton, 5-ton and 7-ton. The construction is the same at both ends, with an auxiliary steering bar which can be applied to the rear steering mechanism so that the operator can describe a figure "S" within a distance of four times the trailer's length. Among the outstanding features are the special heavy duty drawbar with spring cushions which absorb the shock of pulling or pushing which relieves the clutch of the motor truck. There is a one-man coupling device which enables the operator to lay the coupling bar on the drawbar and then back the motor truck until it automatically catches. Semi-trailer types are made in four sizes—2½-, 3½-, 5½- and 11-ton. The outstanding feature of the Warner semi-trailer lies in the construction of the Warner fifth-wheel with its scientific adaptation of the ball and socket principle. Warner two-wheel trailers are made in four sizes—1¼-ton, 1¾-ton, 2¾-ton and 5½-ton. The requirements of many lines of business call for special construction and changes which can be furnished. Auto-trailers are furnished in many types with capacity of 1,250 pounds, 1,500 pounds and 2,500 pounds.

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Motor Truck Specifications

Major Specifications of Internal-Combustion and Electric Trucks, Grouped According to Load-rating and Arranged Alphabetically by Brand-name.

MOTOR TRUCK MAKERS

(Brand-names are in bold-face type.)

Abbott-Downing. See Concord.
Acason Motor Truck Co., Detroit, Mich.—1, 1½, 2, 3½ & 5-ton.
Ace—American Motor Truck Co., Newark, O.—1½ & 2½-ton.
Acme Motor Truck Co., Cadillac, Mich.—1, 1½, 2, 3½ & 5-ton.
Air-O-Flex Auto Corp., Detroit.—1½-ton.
All-American Truck Co., Chicago.—1-ton.
All-Power Truck Co., Detroit, Mich.—3½-ton.
American Commercial Car Co. See Wolverine.
American Motor Truck Co. See Ace.
American & British Mfg. Co. See A & B.
Apex—Hamilton Motors Co., Grand Haven, Mich.—1, 1½ & 2½-ton.
Armleder Co. (O.), Cincinnati, O.—2 & 3½-ton.
Atlantic Electric Vehicle Co., Newark, N. J.—1, 2, 3½, 5 & 6-ton.
Atlas—Martin Truck & Body Corp., York, Pa.—¾ & 1½-ton.
Atterbury Motor Car Co., Buffalo, N. Y.—1½, 2, 3½ & 5-ton.
Autocar Co., Ardmore, Pa.—2-ton.
Autohorse—One Wheel Truck Co., St. Louis, Mo.—5-ton.
Available Truck Co., Chicago—2, 2½, 3½ & 5-ton.
A & B—American & British Mfg. Co., Providence, R. I.—5-ton.
Beck—Hawkeye Motor Truck Works, Cedar Rapids, Ia.—1, 1½, 2 & 2½-ton.
Beech Creek Truck & Auto Co., Beech Creek, Pa.—3-ton.
Bell—Iowa Motor Truck Co., Ottumwa, Ia.—1½ & 2½-ton.
Bessemer Motor Truck Co., Grove City, Pa.—1, 1½, 2½ & 3½-ton.
Bethlehem Motors Corp., Allentown, Pa.—1½, 2½ & 3½-ton.
Brinton Motor Truck Co., Philadelphia.—1 & 2½-ton.
Briscoe Motor Corp., Jackson, Mich.—½ & 1-ton.
Brockway Motor Truck Co., Cortland, N. Y.—1½, 2, 3½ & 5-ton.
Chevrolet Motor Co., Flint, Mich.—1-ton.
Chicago Motor Truck, Inc., Chicago.—1, 1½, 2½ & 3½-ton.
Clyde Cars Co. See Clydesdale.
Clydesdale—Clyde Cars Co., Clyde, O.—1, 1½, 2, 3½ & 5-ton.
Collier Motor Truck Co., Bellevue, O.—1, 1½ & 2-ton.
Columbia Motor Truck & Trailer Co., Pontiac, Mich.—1 & 2-ton.
Comet Automobile Co., Decatur, Ill.—1½-ton.
Commerce Motor Car Co., Detroit.—1-ton.
Commercial Truck Co. of America. See C. T.
Concord—Abbott-Downing, Concord, N. H.—1½ & 2½-ton.
Conestoga Motor Truck Co., Lancaster, Pa.—1 & 2-ton.
Corbitt Motor Truck Co., Henderson, N. C.—1, 1½, 2, 2½, 3½ & 5-ton.
Corliss Motor Truck Co., Corliss, Wis.—½-ton.
Couple-Gear Freight-Wheel Co., Grand Rapids, Mich.—3½, 5 & 7-ton internal-combustion-electric and electric.
Croce Auto Co., Asbury Park, N. J.—½-ton.
C. T.—Commercial Truck Co. of America, Philadelphia.—½, 1, 2, 3½ & 5-ton electric.
Dart Truck & Tractor Corp., Waterloo, Ia.—1, 2 & 3½-ton.
Day-Elder Motors Corp., Newark, N. J.—¾, 1, 1½, 2, 2½, 3½ & 5-ton.
Dearborn Truck Co., Chicago—1, 1½ & 2-ton.
Defiance—Turnbull Motor Truck & Wagon Co., Defiance, O.—1½ & 2-ton.
Dekalb Wagon Co., Dekalb, Ill.—2 & 2½-ton.
DeMartini (F. J.), San Francisco, Cal.—1, 2, 3½ & 4-ton.
Denby Motor Truck Co., Detroit.—1, 2, 2½, 3½ & 5-ton.
Dependable Truck & Tractor Co., Galesburg, Ill.—1½ & 2½-ton.
Diamond T Motor Truck Co., Chicago.—1, 1¼, 1½, 2, 3½ & 5-ton.
Diehl Motor Truck Works, Philadelphia.—¾-ton.
Doane Motor Truck Co., San Francisco, Cal.—2½ & 6-ton.
Dodge Bros., Detroit, Mich.—½-ton.
Dorris Motor Car Co., St. Louis, Mo.—2 & 3½-ton.
Douglas Motors Corp., Omaha, Neb.—1, 1½ & 2½-ton.
Duplex Truck Co., Lansing, Mich.—3½-ton.
Duryea Motors, Inc., Philadelphia.—½-ton.
Ellsworth—Mills-Ellsworth Co., Keokuk, Ia.—½-ton.
Fageol Motors Co., Oakland, Cal.—2½, 3½ & 5-ton.
Famous Trucks, Inc., St. Joseph, Mich.—1 & 1½-ton.
Fargo Motor Car Co., Chicago.—2-ton.
Federal Motor Truck Co., Detroit.—1, 1½, 2, 3½ & 5-ton.
Ford Motor Co., Detroit.—1-ton.
Forschler Motor Truck Mfg. Co., New Orleans, La.—¾, 1, 1½ & 2-ton.
Four Wheel Drive Auto Co. See FWD.
Fulton Motor Truck Co., Farmingdale, L. I., N. Y.—1½-ton.
FWD—Four Wheel Drive Auto Co., Clintonville, Wis.—3-ton.
Gabriel Motor Truck Co., Cleveland, O.—1, 2 & 4-ton.
Garford Motor Truck Co., Lima, O.—1¼, 2, 3½, 5 & 6-ton.
Gary Motor Truck Co., Gary, Ind.—1, 1½, 2, 2½ & 3½-ton.
General Motors Truck Co. See GMC.
Geneva Wagon Co., Geneva, N. Y.—¾-ton.
Gerlinger Motor Car Co. See Gersix.
Gersix—Gerlinger Motor Car Co., Portland, Ore.—2½-ton.
Giant Truck Corp., Chicago.—1, 1½, 2 & 3½-ton.
GMC—General Motors Truck Co., Pontiac, Mich.—¾, 1, 1½, 2, 3½ & 5-ton.
Gramm-Bernstein Motor Truck Co., Lima, O.—1½, 2, 2½, 3½ & 5-ton.
Grant Motor Car Co., Cleveland, O.—¾, 1½ & 2-ton.
Hahn Motor Truck & Wagon Co., Hamburg, Pa.—1, 1¼ & 2½-ton.
Hall—Lewis-Hall Iron Works, Detroit.—2, 3½ & 5-ton.
Hamilton Motors Co. See Apex.
Harvey Motor Truck Co., Harvey, Ill.—2, 2½, 3½ & 5-ton.
Hawkeye Motor Truck Works. See Beck.
Hawkeye Truck Co., Sioux City, Ia.—1½ & 2-ton.
Hebb Motors Co. See Patriot.
Hendrickson Motor Truck Co., Chicago.—2 & 3½-ton.
Higrade Motors Co., Harbor Springs, Mich.—1-ton.
Hoover Wagon Co., York, Pa.—1-ton.
Huffman Bros. Motor Co., Elkhart, Ind.—1½-ton.
Hurlburt Motor Truck Co., New York.—2, 3½ & 5-ton.
Independent Motor Co., Youngstown, O.—1 & 2-ton.
Independent Motor Truck Co., Davenport, Ia.—1, 1½ & 2-ton.
Indiana Truck Corporation, Marion, Ind.—1, 1½, 2, 3½ & 5-ton.
International Harvester Co. of America, Chicago.—¾, 1, 1½ & 2-ton.
International Motor Co. See Mack.
Iowa Motor Truck Co. See Bell.
Jackson Motors Corp., Jackson, Mich.—3½-ton.
Jones Motor Car Co., Wichita, Kan.—1-ton.
Jumbo—Nelson Motor Truck Co., Saginaw, Mich.—2½-ton.
Kalamazoo Motor Corp., Kalamazoo, Mich.—1½, 2½ & 3½-ton.
Kankakee Automobile Co., Kankakee, Ill.—2½-ton.
Kearns Motor Car Co., Beavertown, Pa.—½ & 1½-ton.
Kelly-Springfield Motor Truck Co., Springfield, O.—1½, 2½, 3½, 4, 5 & 6-ton.
Kentucky Wagon Co. See Old Hickory.
Kimball Motor Truck Co., Los Angeles, Cal.—1½, 2, 4, 5 & 6-ton.
King-Zeitler Co., Chicago.—1½, 2 & 3½-ton.
Kissel Motor Car Co., Hartford, Wis.—¾, 1½, 2, 3½ & 5-ton.
Kleiber Co., Inc., San Francisco, Cal.—1, 1½, 2, 2½, 3½ & 5-ton.
Koehler Motors Corp. (H. J.), Newark, N. J.—1¼ & 2½-ton.
Lange Motor Truck Co., Pittsburgh, Pa.—2-ton.
Lansden Co., Inc., Brooklyn, N. Y.—½, 1, 2, 3½, 5 & 6-ton electric.
Larrabee-Deyo Motor Truck Co., Inc., Binghamton, N. Y.—1, 2½, 3½ & 5-ton.
Lewis-Hall Iron Works. See Hall.
L. M. C.—Louisiana Motor Car Co., Shreveport, La.—2½-ton.
Locomobile Co. of America. See Riker.
Louisiana Motor Car Co. See L. M. C.
Loyal Motor Truck Co., Erie, Pa.—½, ¾ and 1-ton.
Maccar Truck Co., Scranton, Pa.—1½, 2½, 3½ & 5-ton.
Mack—International Motor Co., New York.—1½, 2, 3½, 5½ & 7½-ton.
Manly—O'Connell Motor Truck Co., Waukegan, Ill.—1½, 2 & 2½-ton.
Mapleleaf Mfg. Co., Windsor, Ont., Canada.—1½, 2½ & 3½-ton.
Martin Truck & Body Co. See Atlas.
Master Trucks, Inc., Chicago.—1½, 2, 3½ & 5-ton.
Maxwell Motor Sales Co., Detroit.—1½-ton.
Menard Motor Truck Co. See Mapleleaf Mfg. Co.
Menominee Motor Truck Co., Menominee, Mich.—¾, 1½, 2, 3½ & 5-ton.
Midland Motor Car & Truck Co., Oklahoma City, Okla.—2 & 2½-ton.
Mills-Ellsworth Co. See Ellsworth.
Milwaukee Locomotive Mfg. Co. See Walter.
Moreland Motor Truck Co., Los Angeles, Cal.—1½, 2½, 4 & 5-ton.
Muskegon Engine Co., Muskegon, Mich.—2-ton.
Mutual Truck Co., Sullivan, Ind.—2, 3½ & 5-ton.
Myers Co. (E. A.), Pittsburgh, Pa.—1 & 1½-ton.
Napoleon Motors Co., Traverse City, Mich.—1 & 1½-ton.
Nash Motors Co., Kenosha, Wis.—1 & 2-ton.
Nelson Motor Truck Co. See Jumbo.
Nelson & LeMoon, Chicago.—1, 1½, 3½ & 5-ton.
Netco—New England Truck Co., Fitchburg, Mass.—2 & 2½-ton.
New England Truck Co. See Netco.
Niles Car & Mfg. Co., Niles, O.—1 & 2-ton.
Noble Motor Truck Co., Kendallville, Ind.—1, 1½, 2, 2½ & 3½-ton.
Northway Motors Corp., Natick, Mass.—2 & 3½-ton.
Norwalk Motor Car Co., Martinsburg, W. Va.—1½-ton.
O'Connell Motor Truck Co. See Manly.
Ogden Motor & Supply Co., Chicago—1 & 2-ton.
O. K.—Oklahoma Auto Mfg. Co., North Muskogee, Okla.—1½ & 3-ton.
Oklahoma Auto Mfg. Co. See O. K.
Old Hickory—Kentucky Wagon Co., Louisville, Ky.—¾ & 1¼-ton.
Old Reliable Motor Truck Co., Chicago.—1½, 2½, 3½, 5 & 7-ton.
Oldsmobile—Olds Motor Works, Lansing, Mich.—¾-ton.
Olds Motor Works. See Oldsmobile.
Oneida Motor Truck Co., Green Bay, Wis.—1¼, 1¾, 2¼, 3½ & 5-ton, internal-combustion, and 2-ton electric.
One Wheel Truck Co. See Autohorse.
Oshkosh Motor Truck Mfg. Co., Oshkosh, Wis.—2-ton.
Packard Motor Car Co., Detroit—1½, 2, 3, 4, 5 & 6-ton.
Paige-Detroit Motor Car Co., Detroit—2½ & 3½-ton.
Palmer-Meyer Motor Car Co., St. Louis, Mo.—1 & 2-ton.
Parker Motor Truck Co., Milwaukee, Wis.—2, 3½ & 5-ton.
Patriot—Hebb Motors Co., Lincoln, Neb.—1½ & 2½-ton.
Piedmont Motor Car Co., Lynchburg, Va.—1 & 1½-ton.
Pierce-Arrow Motor Car Co., Buffalo, N. Y.—2 & 5-ton.
Pony—Minnesota Machinery & Foundry Co., Minneapolis, Minn.—800 pounds.
Power Truck & Tractor Co., Detroit.—2-ton.
Rainier Motor Corp., New York.—¾, 1, 1½ & 2-ton.
Reliance Motor Truck Co., Appleton, Wis.—1½ & 2½-ton.
Rennoc-Leslie Motor Co., Philadelphia.—2½-ton.
Reo Motor Car Co., Lansing, Mich.—¾-ton.
Republic Motor Truck Co., Alma, Mich.—¾, 1, 1½, 2 & 3½-ton.
Riker—Locomobile Co. of America, Bridgeport, Conn.—3 & 4-ton.
Rowe Motor Mfg. Co., Lancaster, Pa.—2, 2½, 3½ & 5-ton.
Royal Motor Truck Co., New York.—1, 1½, 2, 2½, 3½, 5 & 6-ton.
Sandow Motor Truck Co., Chicago.—1, 1½, 2, 2½, 3½ & 5-ton.
Sanford Motor Truck Co., Syracuse, N. Y.—2½, 3½ & 5-ton.
Schacht Motor Truck Co., Cincinnati, O.—2, 2½, 3½ & 5-ton.
Schleicher Motor Vehicle Co., New York.—3 & 5-ton.
Schwartz Motor Truck Co., Reading, Pa.—1½, 2½ & 5-ton.
Selden Truck Corp., Rochester, N. Y.—1½, 2, 3½ & 5-ton.
Seneca Motor Vehicle Co., Fostoria, O.—½-ton.
Service Motor Truck Co., Wabash, Ind.—1, 1½, 2½, 3½ & 5-ton.

[*Continued on page* 64.]

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800—2,000 (Rainier) INTERNAL-COMBUSTION

Brand-name and model name or number.	Price f. o. b. factory with seat and tires but without body.	Horse-power rating by S. A. E. formula.	Bore and stroke of engine in inches.	Make of engine and model name or number.	Lubrication (Circulating, Splash).	Make of governor (N indicates None).	Water-circulation (Pump, Thermo-syphon).	Radiator (Cellular, Tubular) and make.	Ignition system (Dry Cells, Magneto, Storage battery) and make of magneto.	Make of carbureter.	Clutch (Cone, Multiple-disk, Plate) and make.	Transmission (Individual-clutch, Planetary, Sliding-gear) and number of forward speeds.	Make of transmission and model name or number.	Line number.
800 Pounds:														
Pony	.....	12.8	2¾x4	Own	C & S	.....	T	C—	S—Atwater-K.	Stromberg	.....	F-3	.....	1
1,000 Pounds:														
Briscoe	$ 835	16.2	3 1-16x5½	Own	.....	N	T	—Sparks W.	S—Conn	Buick	C—Own	S-3	Own	2
Corliss, A	800	15.6	3½x4½	.....	.....	.....	T	.....	M—Splitdorf	Schebler	M—.....	.....	.....	3
Croce, 17	825	16.9	3½x5	Wisconsin	.....	.....	.....	.....	M—Bosch	Zenith	M—Brown-Lipe	S-3	Brown-Lipe	4
Dodge	935	24.2	3½x4½	Own	C & S	.....	P	T—	S—Northeast	Stewart	M—.....	S-3	.....	5
Duryea, C	675	12.0	.....	.....	S	N	.....	.....	M—Bosch	Kingston	.....	.....	.....	6
Ellsworth, 25A	855	22.5	3¾x5	Lycoming	C & S	N	T	C—Standard	S—	Carter	M—Mechanics	S-3	Mechanics	7
Kearns	850	16.9	3½x5	Lycoming	.....	N	.....	.....	S—Conn	Carter	M—Mechanics	S-3	Mechanics	8
Loyal	950	15.6	3½x4½	LeRoi, C2	S	N	T	.....	S—Atwater-K.	Stromberg	P—Borg & Beck	S-3	Covert	9
Seneca, T	.....	15.6	3½x4½	LeRoi, C2	C & S	N	T	C—Fedders	.....	Schebler	M—Detroit	S-3	Detroit	10
Studebaker, SF	.....	24.2	3½x5	Own	.....	N	P	C—McCord	M—Remy	Schebler	C—Own	S-3	Own	11
Vim, 21	1,095	14.4	3 x4½	Own	C & S	N	T	T—McCord	M—Dixie	Zenith	C—Own	S-3	Own	12
1,500 Pounds:														
Atlas, 19	1,135	19.6	3½x5	Lycoming	.....	N	T	—Own	M—Remy	.....	P—Borg & Beck	S-3	Own	13
Day-Elder, J	1,045	15.6	3½x4½	LeRoi, C2	C & S	N	T	T—Bush	M—Berling	Schebler	M—Detroit	S-3	Detroit	14
Diehl, A	1,575	19.6	3½x5	Continental, N	C & S	.....	T	.....	M—Bosch	Zenith	P—Borg & Beck	S-3	Durston	15
Dispatch, G	1,200	22.5	3¾x5	Wisconsin	C	.....	T	.....	M—Bosch	Rayfield	.....	4	.....	16
Forschler	1,585	15.6	3½x4½	LeRoi	.....	Monarch	.....	.....	M—Dixie	Zenith	M—Detroit	S-3	.....	17
Geneva, 1	.....	22.1	5½x5¼	Beaver	.....	N	.....	.....	M—Simms	Schebler	P—Warner	P-2	.....	18
GMC, 16	1,595	22.5	3¾x5	Continental, N	C & S	Monarch	P	T—Own	M—Eisemann	Marvel	M—Own	S-3	Own	19
International, H	1,550	19.6	3½x5¼	Own	C & S	Own	P	P—Own	M—Bosch	Holley	M—Own	S-3	Own	20
Kissel, Delivery	.....	24.0	3¾x5½	Own	C & S	Pierce	P	T—McCord	M—Eisemann	Stromberg	M—Warner	S-3	Warner	21
Loyal	1,245	16.9	3½x5	Herschell-Spill'n	S	N	T	T—	S—Atwater-K.	Stromberg	P—Borg & Beck	S-3	Covert	22
Menominee	.....	22.5	3¾x5	Continental, N	C & S	Monarch	T	C—G & O	M—Eisemann	Stromberg	M—Fuller	S-	Fuller, TU1	23
Old Hickory, M	995	16.9	3½x5	Lycoming	C & S	.....	T	C—Long	S—Conn	Carter	C—Lycoming	S-3	Grant-Lees	24
Oldsmobile	1,295	21.7	3 11-16x5¼	Own	C & S	.....	T	C—	M—Auto-Lite	Zenith	C—	S-3	.....	25
Rainier, R11	1,750	19.6	3½x5	Continental, N	C & S	Monarch	P	C—Harrison	M—Simms	Zenith	M—Brown-Lipe	S-3	Brown-Lipe	26
Reo, Speedwagon	1,285	27.2	4½x4½	Own	.....	N	P	T—Own	M—Remy	Johnson	M—Own	S-3	Own	27
Republic, Despatch	1,094	16.9	3½x5	Own	C & S	Ruggles	T	C—G & O	M—Remy	Stromberg	M—Own	S-3	Own	28
Stewart, 11	1,195	15.6	3½x4½	LeRoi, 2C	C & S	N	T	T—Bush	M—Eisemann	Zenith	P—Borg & Beck	S-3	Durston, O2500-B	29
Texan	1,200	28.9	4½x	Golden, B & S	C	.....	.....	.....	M—Delco	Carter	M—Golden, B & S	S-3	Grant-Lees	30
Tiffin, A	1,100	19.6	3½x5	Continental, N	C & S	N	T	T—G & O	M—Bosch	Schebler	C—Detroit	S-3	Detroit	31
Watson	.....	22.5	3¾x5½	Waukesha, BUX	S	Waukesha	P	C—	.....	.....	M—Brown-Lipe	S-3	Brown-Lipe	32
White, 15	2,400	22.5	3¾x5½	Own	C & S	N	P	C—	M—	Own	P—Own	S-4	Own	33
White Hickory, E	.....	22.5	3¾x5	Continental, N	C & S	Simplex	P	T—Chicago	M—Eisemann	Stromberg	M—.....	S-3	Fuller	34
1,800 Pounds:														
Grant, 12	1,065	16.9	3½x5	Herschell-Spill'n	C	N	P	C—Fedders	M—Splitdorf	Carter	P—Borg & Beck	S-3	Grant-Lees, K	35
2,000 Pounds:														
Acason, R	.....	22.5	3¾x5½	Waukesha, BUX	S	Waukesha	P	C—G & O	M—Eisemann	Stromberg	M—Fuller	S-3	Fuller, TU¾	36
Acme, B	1,950	22.5	3¾x5	Continental, N	C & S	Duplex	T	T—G & O	M—Eisemann	Rayfield	P—Borg & Beck	I-3	Cotta, BUC	37
All-American, A	1,295	16.9	3½x5	Herschell-Spill'n	C & S	N	T	C—Standard	M—Simms	Stromberg	P—Borg & Beck	S-3	Grant-Lees, K	38
Apex, C	1,220	19.6	3½x5	Buda	S	N	T	.....	S—Autolite	Stromberg	M—Fuller	S-3	Fuller, TU¾	39
Beck, A	1,550	19.6	3½x5	Continental, N	C & S	Pierce	T	C—Ideal	M—Bosch	Stromberg	M—Fuller	S-3	Fuller, TU¾	40
Bessemer, G	1,575	19.6	3½x5	Continental, N	C & S	N	T	C—Ideal	M—Bosch	Zenith	M—Fuller	S-3	Fuller, TU	41
Brinton, H	1,500	16.9	3½x5	Wisconsin	.....	N	T	T—	M—	.....	M—	S-3	.....	42
Briscoe, T-34	.....	18.2	3½x5	Own	.....	N	T	—Perfection	S—Conn	Buick	C—Own	S-3	Own	43
Chevrolet, T	1,460	21.7	3¾x5¼	Own	.....	Monarch	P	C—Harrison	M—Remy	Zenith	C—Own	S-3	Warner	44
Chisago, C-1	2,200	19.6	3½x5	Continental, N	C & S	Pierce	P	T—	N—Bosch	Zenith	M—Brown-Lipe	S-3	Brown-Lipe	45
Clydesdale, 32	.....	22.5	3¾x5	Continental, N	C & S	Own	T	T—Own	M—Bosch	Zenith	M—Brown-Lipe	S-3	Brown-Lipe, 30	46
Collier, 18	1,650	19.6	3½x5	Continental	C & S	Monarch	P	T—Chicago	M—Eisemann	Zenith	M—	S-3	Fuller	47
Columbia, F	1,750	22.5	3¾x5	Continental, N	C & S	Pierce	P	T—Long	M—Dixie	Shakespe're	P—Borg & Beck	S-3	Covert	48
Commerce, E	1,590	22.5	3¾x5	Continental, N	C & S	N	T	T—Long	M—Eisemann	Zenith	C—Detroit	S-3	Detroit, C	49
Conestoga	1,850	19.6	3½x5	Continental	C & S	.....	.....	T—Eng. & M	M—Bosch	Zenith	M—Fuller	S-3	Fuller, TU¾	50
Corbitt	2,200	22.5	3¾x5	Continental, N	C & S	Duplex	T	C—Ideal	M—Eisemann	Stromberg	M—Fuller	S-3	Fuller	51
Dart, E	2,100	22.5	3¾x5½	Buda, WU	C	N	T	C—Ideal	M—Eisemann	Zenith	M—Fuller	S-3	Fuller, TU	52
Day-Elder, A	1,775	19.6	3½x5	Continental, N	C & S	N	T	T—Bush	M—Berling	Zenith	M—Covert	S-3	Covert, MUNC	53
Dearborn, C	1,500	23.6	3¾x4½	.....	C	N	T	T—Chicago	M—Dixie	Stromberg	P—	S-3	Grant-Lees	54
Denby, 12	1,950	19.6	3½x5	Continental, N	C & S	Monarch	T	T—Long	M—Eisemann	Stromberg	M—Fuller	S-3	Fuller, TU¾	55
Diamond T, J5	2,360	19.6	3½x5	Continental, N	C & S	Pierce	T	T—G & O	M—Bosch	Stromberg	M—Brown-Lipe	S-3	Brown-Lipe, 30	56
Douglas, C	1,700	19.6	3½x5½	Buda, RU	C & S	N	T	T—Chicago	M—Eisemann	Schebler	M—Fuller	S-3	Fuller, TU¾	57
Famous, B10	1,690	19.6	3½x5	Continental, N	C & S	Monarch	T	T—Chicago	M—Eisemann	Stromberg	M—Fuller	S-3	Fuller, TU¾	58
Federal, S	1,900	22.5	3¾x5	Continental, N	C & S	Monarch	P	Own	M—Eisemann	Zenith	P—Borg & Beck	S-3	Own	59
Ford, T	550	22.5	3¾x4	Own, T	S	N	T	T—Own	M—Own	Holley	M—Own	P-2	Own	60
Forschler	2,000	19.6	3½x5	Continental, N	C & S	Monarch	.....	.....	M—Bosch	Zenith	M—Fuller	S-3	Fuller	61
Gabriel, C	2,000	30.0	4½x5½	Buda, OU	C	Duplex	P	T—G. & O	M—Bosch	Rayfield	P—Borg & Beck	S-3	Brown-Lipe, 50	62
Garford, 75C	2,500	22.5	3¾x5½	Buda, QU	C & S	Simplex	P	T—Own	M—Splitdorf	Rayfield	M—Brown-Lipe	S-3	Brown-Lipe, 50	63
Gary, F	.....	22.5	3¾x5	Continental, N	S	Pierce	T	C—Chicago	M—Eisemann	Master	M—Fuller	S-3	Fuller, TU¾	64
Giant, 15	1,850	19.6	3½x5	Continental, N	S	N	T	C—Ideal	M—Eisemann	Schebler	M—Warner	S-3	Warner, T38G	65
GMC, 21	2,025	22.5	3¾x5	Continental, N	C & S	Monarch	P	T—Own	M—Eisemann	Marvel	M—Own	S-3	Own	66
Hahn, C	1,375	19.6	3½x5	Continental, N	C & S	.....	.....	T—Chicago	M—Eisemann	Stromberg	M—Detroit	S-3	Detroit	67
Higrade, A18	2,100	19.6	3½x5	Continental, N	C & S	Simplex	.....	C—Perfex	M—Eisemann	Zenith	P—Fuller	I-3	Fuller	68
Hoover, 15B	1,435	19.6	3½x5	Continental, N	C & S	.....	T	C—Candler	M—Splitdorf	Schebler	M—Fuller	S-3	Fuller	69
Independent (Iowa)	1,550	19.6	3½x5	Continental, N	C & S	.....	T	T—Chicago	M—Bosch	Stromberg	M—Fuller	S-3	Fuller	70
Ind'p'nd't, F (Ohio)	1,685	19.6	3½x5	Continental, N	C & S	Monarch	.....	T—Chicago	M—Eisemann	Zenith	M—Fuller	S-3	Fuller, TU¾	71
Indiana, 3	2,150	22.5	3¾x5½	Waukesha, BUX	S	Waukesha	P	T—Long	M—Eisemann	Stromberg	P—Borg & Beck	S-3	Covert, G1	72
International, F	1,850	19.6	3½x5½	Own	C & S	Own	P	T—Own	M—Bosch	Holley	N—Own	S-3	Own	73
Jones, 31A	1,495	22.5	3¾x5	Continental, N	C & S	N	T	C—Fedders	M—Eisemann	Stromberg	P—Borg & Beck	S-3	Grant-Lees	74
Kleiber, AA	2,400	22.5	3¾x5½	Continental, C4	C & S	Pierce	P	C—Perfection	M—Bosch	Stromberg	M—Hele-Shaw	S-3	Brown-Lipe	75
Larrabee, M	1,950	22.5	3¾x5	Continental, N	C & S	Pierce	T	T—Bush	M—Bosch	Schebler	M—Brown-Lipe	S-3	.....	76
Loyal, 69	1,500	16.9	3½x5	Herschell-Spill'n	.....	N	T	T—	S—Atwater-K.	Stromberg	M—Borg & Beck	S-3	Covert	77
Myers, 60	1,345	19.6	3½x5	Lycoming, K	C & S	N	T	C—Own	M—Swiss	Carter	M—Mechanics	S-3	Mechanics	78
Napoleon, 9	1,385	19.6	3½x5	Gray	C & S	.....	T	T—Chicago	S—Conn	Stromberg	M—Fuller	S-3	Fuller	79
Nash, 2018	1,650	22.5	3¾x5¼	Own	C	Duplex	P	T—Long	M—Eisemann	Stromberg	P—Borg & Beck	S-3	Detroit, C	80
Nelson & LeM'n, F1	2,250	27.2	4½x5¼	Continental, C4	C & S	Pierce	P	T—Chicago	M—Bosch	Stromberg	M—Brown-Lipe	S-3	Brown-Lipe, 35	81
Niles, B	1,500	19.6	3½x5	Continental, N	C & S	Pierce	.....	.....	M—Eisemann	Stromberg	P—Borg & Beck	S-3	Covert	82
Noble, A20	.....	.....	.....	Buda	C & S	Pierce	.....	T—Chicago	M—Eisemann	Stromberg	M—Fuller	S-3	Fuller, TU¾	83
Ogden, A1	.....	22.5	3¾x5	Continental, N	C & S	Pierce	.....	T—Chicago	M—Bosch	Rayfield	M—Brown-Lipe	S-3	Brown-Lipe	84
Palmer	1,585	22.5	3¾x5	Continental, N	C & S	Pierce	P	C—Fedders	M—Bosch	Stromberg	M—Fuller	S-3	Fuller	85
Rainier, R9	1,875	16.9	3½x3½	Continental, N	C & S	Monarch	T	C—Harrison	M—Simms	Zenith	M—Brown-Lipe	S-3	Brown-Lipe	86

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TRUCK SPECIFICATIONS

800—2,000 (Rainier)

Line number.	Final drive (Bevel-gear, Chain, External-gear, Internal-gear, Spur-and-bevel, Worm-gear).	Make of rear axle and model name or number.	Front springs (½, ¾, or Full elliptic; Transverse).	Rear springs (Cantilever; ½, ¾, or Full elliptic; Transverse.	Make of springs.	Service brake (Contracting, Expanding).	Emergency brake (Contracting, Expanding).	Wheels (Iron, Steel, Wood) and make.	Number and location of driving-wheels (All-around, Front, Rear).	Make of steering-gear.	Frame material Pressed-steel, Rolled-steel, Wood)	Make of frame.	Wheel-base in inches.	Is self-starter furnished? (Yes or No.)	Front tire size in inches (Dual, Pneumatic)	Rear tire size in inches (Dual, Pneumatic)	Brand-name and model name or number.
																	800 Pounds:
1	.....	.....	½	½	Tuthill.....	...	...	.....	2-R	Own.....	....	.....	92	N	28x3	28x3	Pony
																	1,000 Pounds:
2	B	Own.....	½	½	Alloy Steel..	C	E	W—.....	2-R	Own.....	P	Own.....	104	N	31x4	31x4	Briscoe
3	B	.....	.....	.....	.....	E	E	W—.....	2-R	.....	P	.....	100	N	31x4	31x4	Corliss, A
4	B	Timken.....	.....	.....	.....	C	E	.....	2-R	.....	P	.....	108	N	32x4	32x4	Croce, 17
5	B	.....	.....	.....	Detroit.....	...	...	W—.....	2-R	Own.....	...	.....	114	Y	33x4p	33x4p	Dodge
6	.....	.....	C	T	.....	E	...	W—.....	2-R	.....	P	.....	86	N	36x3½p	36x3½p	Duryea, C
7	W	Wisconsin, L.....	½	C	Sheldon.....	E	E	W—Salisbury..	2-R	.....	P	Parish.....	106	Y	30x3½p	30x3½p	Ellsworth, 25A
8	B	Peru.....	.....	.....	.....	...	...	.....	2-R	Lavine.....	...	.....	107	N	30x3½	30x3½	Kearns
9	I	Torbensen.....	½	½	.....	C	E	W—.....	2-R	Ross.....	P	Parish & B.	110	Y	32x4p	32x4p	Loyal
10	B	Adams.....	½	C	Mather.....	E	C	W—Prudden..	2-R	Ditweiler....	P	Savage.....	108	N	30x3½p	30x3½p	Seneca, T
11	B	Own.....	.....	.....	Own.....	E	C	W—Kelsey....	2-R	Gemmer.....	P	Own.....	142	N	35x4½	35x4½	Studebaker, SF
12	B	Own.....	½	½	Sheldon.....	C	E	W—Own.....	2-R	Jacox.....	P	Parish.....	108	N	31x4P	31x4P	Vim, 21
																	1,500 Pounds:
13	I	Hess.....	.....	.....	Rowland.....	C	E	W—.....	2-R	Lavine.....	P	Parish.....	118	N	32x4	32x4	Atlas, 19
14	W	Sheldon.....	½	½	Iron City....	E	E	W—Jones.....	2-R	Gemmer.....	P	Savage.....	108	Y	33x4p	33x4p	Day-Elder, J
15	I	Torbensen.....	½	½	.....	C	C	W—.....	2-R	.....	....	.....	115	N	34x4½p	35x5p	Diehl, A
16	I	.....	½	½	Tuthill.....	...	...	W—.....	2-R	.....	...	.....	120	N	34x4p	34x4p	Dispatch, G
17	W	Sheldon.....	.....	.....	Delaney.....	E	E	.....	2-R	Ross.....	...	.....	120	N	32x2½	32x3	Forschler
18	C	Sheldon.....	.....	.....	Sheldon.....	...	...	W—.....	2-R	.....	...	.....	96	N	34x2	36x2½	Geneva, 1
19	B	Own.....	½	½	Detroit.....	E	C	W—Hayes....	2-R	Jacox.....	P	Parish.....	132	N	35x5p	35x5p	GMC, 16
20	I	Own.....	½	.....	.....	E	E	W—.....	2-R	Ross.....	P	.....	115	N	36x3	36x3½	International, H
21	B	Own.....	½	½	Mather.....	C	C	W—Prudden...	2-R	Jacox.....	P	Smith.....	135	N	34x4½p	34x4½p	Kissel, Delivery
22	I	Torbensen.....	½	½	.....	C	E	W—.....	2-R	.....	P	Parish & B.	120	Y	32x4½p	32x4½p	Loyal
23	W	Timken, 6456.....	½	½	Tuthill.....	E	E	W—Standard..	2-R	Ross.....	R	Own.....	124	N	34x3½	34x4	Menominee
24	B	Salisbury.....	½	F	Standard....	C	E	W—Salisbury .	2-R	C. A. S.....	R	Own.....	112	Y	33x4	33x4	Old Hickory, M
25	I	Torbensen.....	½	½	.....	C	E	W—.....	2-R	.....	P	.....	128	Y	35x5p	35x5p	Oldsmobile
26	B	Timken.....	½	½	Perfection...	E	E	W—Schwarz...	2-R	Lavine.....	P	Parish.....	125	N	35x4½p	35x4½p	Rainier, R11
27	S	Own.....	.....	.....	Penn.....	E	....	W—.....	2-R	Own.....	P	Own.....	128	Y	34x4½p	34x4½p	Reo, Speedwagon
28	I	Torbensen.....	.....	.....	Mather.....	C	C	W—.....	2-R	Jacox.....	P	Savage.....	110	N	32x3	32x3½	Republic, Despatch
29	I	Clark, AS.....	½	½	.....	C	E	W—Wayne....	2-R	C. A. S.....	P	.....	110	Y	32x4p	32x4p	Stewart, 11
30	B	Salisbury.....	½	½	.....	E	E	W—.....	2-R	.....	...	.....	115	Y	33x4p	33x4p	Texan
31	I	Russel.....	.....	.....	Kalamazoo..	E	C	W—Bimel	2-R	Lavine.....	P	Parish & B.	110	N	34x4½	35x4½	Tiffin, A
32	W	.....	½	½	Sheldon.....	E	E	.....	2-R	.....	P	.....	.....	Y	34x4½p	34x4½p	Watson
33	B	Own.....	½	½	.....	C	E	W—.....	2-R	Own.....	P	.....	133½	N	34x4½p	34x4½p	White, 15
34	W	Timken.....	½	½	.....	E	E	W—.....	2-R	.....	P	.....	124	N	34x4½p	34x4½p	White Hickory, E
																	1,800 Pounds:
35	I	Torbensen.....	½	½	Perfection...	C	E	W—Bimel.....	2-R	Ditweiler....	P	Parish.....	115	Y	32x4p	32x4p	Grant, 12
																	2,000 Pounds:
36	W	Timken, 6456.....	½	½	Detroit.....	E	E	W—Hayes....	2-R	Lavine.....	P	Savage.....	140	N	36x3½	36x5	Acason, R
37	W	Timken, 6456.....	½	½	Detroit.....	E	E	W—Hayes....	2-R	Ross.....	P	Smith.....	130	N	34x3½	34x5	Acme, B
38	I	Torbensen.....	½	½	Detroit.....	C	E	W—Mutual...	2-R	Ross.....	P	Detroit....	130	N	33x4p	34x4	All-American, A
39	I	Torbensen, OX....	½	½	Detroit.....	C	E	W—.....	2-R	Lavine.....	R	Own.....	130	N	33x4p	32x3½	Apex, C
40	I	Clark, 1B.....	½	½	Higgins.....	C	E	W—Bimel.....	2-R	Lavine.....	P	Parish & B.	124	N	34x3	34x3½	Beck, A
41	I	Torbensen, A.....	½	½	Perfection...	C	E	W—Schwarz...	2-R	Ross.....	P	Savage.....	124	N	34x3½	34x4	Bessemer, G
42	W	.....	½	½	.....	E	E	W—.....	2-R	Ross.....	....	Own.....	125	N	33x4½	33x4½	Brinton, H
43	I	Russel.....	½	½	Alloy Steel..	C	E	W—.....	2-R	Lavine.....	P	Parish.....	121	N	34x4	34x4	Briscoe, T-34
44	W	Industrial.....	½	½	Perfection...	E	E	W—Hayes....	2-R	Warner.....	R	Own.....	125	N	33x4	35x5	Chevrolet, T
45	W	Timken	½	½	Mather	E	E	W—.....	2-R	Gemmer	R	.....	132	N	36x3	36x4	Chicago, C-1
46	W	Timken, 6352.....	½	½	Standard....	E	E	W—.....	2-R	Ross.....	P	Parish & B.	154	N	34x3½	34x5	Clydesdale, 32
47	W	.....	½	½	.....	E	E	W—.....	2-R	Ross.....	P	.....	140	N	34x4	34x5	Collier, 18
48	I	Russel, O.....	½	½	Perfection...	C	E	W—Hayes....	2-R	Own.....	R	Own.....	126	N	32x3	32x4	Columbia, F
49	I	Torbensen, A.....	½	½	Detroit.....	C	E	W—Bimel.....	2-R	Jacox.....	P	Detroit....	126	Y	34x3	34x4	Commerce, E
50	W	Wisconsin, 800G...	½	½	.....	E	E	W—.....	2-R	Ross.....	P	.....	118	N	34x3¼	34x5	Conestoga
51	W	Sheldon.....	½	½	Sheldon.....	E	E	W—Bimel	2-R	Lavine.....	P	.....	130	N	34x3½	34x4	Corbitt
52	W	Timken, 6456.....	½	½	Mather.....	E	E	W—Prudden..	2-R	Ross.....	P	Savage.....	130	N	34x3½	34x5	Dart, E
53	W	Wisconsin, 800G...	½	½	Iron City....	E	E	W—Jones.....	2-R	Ross.....	P	Savage.....	128	N	34x3	34x4	Day-Elder, A
54	I	Torbensen.....	½	½	Cleveland...	C	E	W—Prudden..	2-R	Ditweiler....	R	Dearborn..	125	N	31x4p	35x5p	Dearborn, C
55	I	Russel, P.....	½	½	Detroit.....	C	E	W—Hayes....	2-R	Ross.....	P	Detroit....	124	N	34x3	34x4	Denby, 12
56	W	Timken, 6460.....	½	½	Mather.....	E	E	W—Prudden..	2-R	Gemmer.....	P	Smith.....	132	N	36x3	36x4	Diamond T, J5
57	I	Torbensen, C.....	½	½	Own.....	C	E	W—.....	2-R	Ross.....	R	Own.....	122	N	34x4½	35x5	Douglas, C
58	I	Clark, 1.....	½	½	Detroit.....	C	E	W—Bimel.....	2-R	Ross.....	P	Savage.....	120	N	34x3½	34x4	Famous, B10
59	W	Timken, 6456.....	½	½	Mather.....	E	E	W—.....	2-R	Gemmer.....	P	.....	132	N	34x3	34x4	Federal, S
60	W	Own.....	T	T	Own.....	C	E	W—.....	2-R	Own.....	P	Own.....	124	N	30x3½p	32x4½p	Ford, T
61	W	Sheldon.....	.....	.....	Delaney.....	E	E	.....	2-R	Ross.....	...	.....	130	N	34x3	34x4	Forschler
62	W	Timken, 6451.....	½	½	Merrill.....	E	E	W—Standard..	2-R	Gemmer.....	P	Parish.....	136	N	35x5p	35x5p	Gabriel, C
63	W	Timken, 6456.....	½	½	Perfection...	E	E	W—.....	2-R	Ross.....	P	Own.....	128	N	34x4½	36x4	Garford, 75C
64	W	Sheldon, W-1500...	½	½	Tuthill.....	E	E	W—Bimel.....	2-R	Ross.....	P	Parish & B.	130	N	36x3½	36x4	Gary, F
65	W	Timken, 6456.....	½	½	Mather.....	E	E	W—Prudden..	2-R	Jacox.....	R	Hydraulic..	138	N	34x3½p	34x5	Giant, 15
66	W	Timken, 6456.....	½	½	Detroit.....	E	E	W—Hayes....	2-R	Lavine.....	P	Parish.....	136	N	34x3½	34x5	GMC, 21
67	I	Torbensen.....	.....	.....	Delaney.....	...	...	W—.....	2-R	Lavine.....	P	Parish.....	127	N	34x3	34x4	Hahn, C
68	W	Sheldon.....	½	½	Perfection...	E	E	W—Prudden..	2-R	Lavine.....	....	Own.....	115	N	35x5	35x5	Higrade, A18
69	W	Sheldon.....	½	½	Sheldon.....	E	E	W—.....	2-R	Lavine.....	P	Detroit....	120	N	32x4	33x4½	Hoover, 15B
70	I	Russel.....	½	½	.....	C	E	W—.....	2-R	Lavine.....	P	.....	134	N	34x3	34x4	Indep'nd'nt, (Iowa)
71	W	Chicago.....	½	½	.....	E	E	W—Bimel	2-R	Wohlrab	P	.....	128	N	34x3	34x4	Ind'p'nd't, F(Ohio)
72	W	Own.....	½	½	.....	E	E	W—Bimel	2-R	Wohlrab	R	Own.....	135	N	34x3½	34x4	Indiana, 3
73	I	Own.....	½	½	.....	E	E	W—.....	2-R	Ross.....	P	.....	128	N	36x3½	36x4	International, F
74	I	Russel, O.....	½	½	Standard....	C	E	W—Prudden..	2-R	C. A. S.....	P	Hydraulic..	130	N	34x3½	34x4	Jones, 31A
75	W	Timken.....	.....	.....	Betts.....	C	E	W—.....	2-R	Ross.....	R	Own.....	130	N	34x3½	34x5	Kleiber, AA
76	W	Sheldon, W1500...	½	½	Merrill.....	E	E	W—Hoopes...	2-R	Ross.....	P	Savage.....	130	N	34x3½	34x5	Larrabee, M
77	I	Torbensen.....	½	½	.....	C	E	W—.....	2-R	.....	P	Parish & B.	130	Y	33x5p	33x5p	Loyal, 69
78	W	Chicago.....	½	½	Cleveland...	C	E	W—Eberly....	2-R	C. A. S.....	P	Parish & B.	130	Y	34x3½	34x4	Myers, 60
79	I	Clark.....	½	½	Mather.....	C	C	W—.....	2-R	Lavine.....	R	Own.....	133	N	32x3½	32x4	Napoleon, 9
80	I	Clark, 1.....	½	½	Alloy Steel..	C	C	W—Auto&Bim	2-R	Jacox.....	P	Smith.....	130	Y	34x3	34x4	Nash, 2018
81	W	Timken, 6460.....	½	½	Tuthill.....	E	E	W—Prudden..	2-R	Lavine.....	R	Own.....	.....	N	36x3½	36x5	Nelson & LeM'n, F1
82	W	Timken.....	.....	.....	.....	E	E	.....	2-R	Gemmer.....	....	.....	124	N	35x5	35x5	Niles, B
83	W	Sheldon, W15.....	½	½	Tuthill.....	E	E	W—Bimel.....	2-R	Lavine.....	P	Parish & B.	144	N	36x3½	36x4	Noble, A20
84	W	Timken.....	½	½	.....	E	E	W—.....	2-R	Gemmer.....	P	.....	136	N	36x3	36x4	Ogden, A1
85	I	Torbensen.....	.....	.....	Champion...	E	....	W—.....	2-R	Ross.....	P	Parish & B.	132	N	34x3½	34x4	Palmer
86	W	Sheldon.....	½	½	Perfection...	C	E	W—Schwarz...	2-R	Lavine.....	P	Parish.....	125	N	32x4	32x4	Rainier, R9

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800—2,000 (Rainier) INTERNAL-COMBUSTION

Brand-name and model name or number.	Price f. o. b. factory with seat and tires but without body.	Horse-power rating by S. A. E. formula.	Bore and stroke of engine in inches.	Make of engine and model name or number.	Lubrication (Circulating, Splash).	Make of governor (N indicates None).	Water-circulation (Pump, Thermo-siphon).	Radiator (Cellular, Tubular) and make.	Ignition system (Dry Cells, Magneto, Storage battery) and make of magneto.	Make of carbureter.	Clutch (Cone, Multiple-disk, Plate) and make.	Transmission (Individual-clutch, Planetary, Sliding-gear) and number of forward speeds.	Make of transmission and model name or number.	Line number.
800 Pounds:														
Pony	.....	12.8	2¼x4	Own	C & S	.....	T	C—	S—Atwater-K.	Stromberg	.....	F-3	.....	1
1,800 Pounds:														
Briscoe	$ 835	16.2	3 1-16x5½	Own	.....	N	T	—Sparks W.	S—Conn	Buick	C—Own	S-3	Own	2
Corliss, A	800	15.6	3½x4½	.....	.....	.....	T	.....	M—Splitdorf	Schebler	M—.....	.....	.....	3
Croce, 17	825	16.9	3½x5	Wisconsin	.....	.....	.....	.....	M—Bosch	Zenith	M—Brown-Lipe	S-3	Brown-Lipe	4
Dodge	935	24.2	3½x4½	Own	C & S	.....	P	T—	S—Northeast	Stewart	M—.....	S-3	.....	5
Duryea, C	675	12.0	.....	.....	S	N	.....	.....	M—Bosch	Kingston	.....	.....	.....	6
Elsworth, 25A	855	22.5	3¾x5	Lycoming	C & S	N	T	C—Standard	S—.....	Carter	M—Mechanics	S-3	Mechanics	7
Kearns	850	16.9	3½x5	Lycoming	.....	N	.....	.....	S—Conn	Carter	M—Mechanics	S-3	Mechanics	8
Loyal	950	15.6	3½x4½	LeRoi, C2	S	N	T	.....	S—Atwater-K.	Stromberg	P—Borg & Beck	S-3	Covert	9
Seneca, T	.....	15.6	3½x4½	LeRoi, C2	C & S	N	T	C—Fedders	.....	Schebler	M—Detroit	S-3	Detroit	10
Studebaker, SF	.....	24.2	3½x5	Own	.....	N	P	C—McCord	M—Remy	Schebler	C—Own	S-3	Own	11
Vim, 21	1,095	14.4	3 x4½	Own	C & S	N	T	T—McCord	M—Dixie	Zenith	C—Own	S-3	Own	12
1,800 Pounds:														
Atlas, 19	1,135	19.6	3½x5	Lycoming	.....	N	T	—Own	M—Remy	.....	P—Borg & Beck	S-3	Own	13
Day-Elder, J	1,045	15.6	3½x4½	LeRoi, C2	C & S	N	T	T—Bush	M—Berling	Schebler	M—Detroit	S-3	Detroit	14
Diehl, A	1,575	19.6	3½x5	Continental, N	C & S	.....	T	.....	M—Bosch	Zenith	P—Borg & Beck	S-3	Durston	15
Dispatch, G	1,200	22.5	3¾x5	Wisconsin	C	.....	T	.....	M—Bosch	Rayfield	.....	..-4	.....	16
Forschler	1,585	15.6	3½x4½	LeRoi	.....	Monarch	.....	.....	M—Dixie	Zenith	M—Detroit	S-3	.....	17
Geneva, 1	.....	22.1	5¼x5¼	Beaver	.....	N	.....	.....	M—Simms	Schebler	P—Warner	P-2	.....	18
GMC, 16	1,595	22.5	3¾x5	Continental, N	C & S	Monarch	P	T—Own	M—Eisemann	Marvel	M—Own	S-3	Own	19
International, H	1,550	19.6	3½x5½	Own	C & S	Own	P	P—Own	M—Bosch	Holley	M—Own	S-3	Own	20
Kissel, Delivery	.....	24.0	3¾x5¾	Own	C & S	Pierce	P	T—McCord	M—Eisemann	Stromberg	M—Warner	S-3	Warner	21
Loyal	1,245	16.9	3½x5	Herschell-Spill'n	S	N	P	T—	S—Atwater-K.	Stromberg	P—Borg & Beck	S-3	Covert	22
Menominee	.....	22.5	3¾x5	Continental, N	C & S	Monarch	T	C—G & O	M—Eisemann	Stromberg	M—Fuller	S-	Fuller, TU1	23
Old Hickory, M	995	16.9	3½x5	Lycoming	C & S	.....	T	C—Long	S—Conn	Carter	C—Lycoming	S-3	Grant-Lees	24
Oldsmobile	1,295	21.7	3 11-16x5½	Own	C & S	.....	T	C—	M—Auto-Lite	Zenith	C—	S-3	.....	25
Rainier, R11	1,750	19.6	3½x5	Continental, N	C & S	Monarch	P	C—Harrison	M—Simms	Zenith	M—Brown-Lipe	S-3	Brown-Lipe	26
Reo, Speedwagon	1,285	27.2	4½x4½	Own	.....	N	P	T—Own	M—Remy	Johnson	M—Own	S-3	Own	27
Republic, Despatch	1,094	16.9	3½x5	Own	C & S	Ruggles	T	C—G & O	M—Remy	Stromberg	M—Own	S-3	Own	28
Stewart, 11	1,195	15.6	3½x4½	LeRoi, 2C	C & S	N	T	T—Bush	M—Eisemann	Zenith	P—Borg & Beck	S-3	Durston, O2500-B	29
Texan	1,200	28.9	4½x	Golden, B & S	C	.....	.....	.....	M—Delco	Carter	M—Golden, B & S	S-3	Grant-Lees	30
Tiffin, A	1,100	19.6	3½x5	Continental, N	C & S	N	T	T—G & O	M—Bosch	Schebler	C—Detroit	S-3	Detroit	31
Watson	.....	22.5	3¾x5¼	Waukesha, BUX	S	Waukesha	P	C—	.....	.....	M—Brown-Lipe	S-3	Brown-Lipe	32
White, 15	2,400	22.5	3¾x5½	Own	C & S	N	P	C—	M—	Own	P—Own	S-4	Own	33
White Hickory, E	.....	22.5	3¾x5	Continental, N	C & S	Simplex	P	T—Chicago	M—Eisemann	Stromberg	M—	S-3	Fuller	34
1,800 Pounds:														
Grant, 12	1,065	16.9	3¼x5	Herschell-Spill'n	C	N	P	C—Fedders	M—Splitdorf	Carter	P—Borg & Beck	S-3	Grant-Lees, K	35
2,800 Pounds:														
Acason, R	.....	22.5	3¾x5¼	Waukesha, BUX	S	Waukesha	P	C—G & O	M—Eisemann	Stromberg	M—Fuller	S-3	Fuller, TU¾	36
Acme, B	1,950	22.5	3¾x5	Continental, N	C & S	Duplex	T	T—G & O	M—Eisemann	Rayfield	P—Borg & Beck	I-3	Cotta, BUC	37
All-American, A	1,295	16.9	3¼x5	Herschell-Spill'n	C & S	N	T	C—Standard	M—Simms	Stromberg	P—Borg & Beck	S-3	Grant-Lees, K	38
Apex, C	1,220	19.6	3½x5	Buda	S	N	T	.....	S—Autolite	Stromberg	M—Fuller	S-3	Fuller, TU¾	39
Beck, A	1,550	19.6	3½x5	Continental, N	C & S	Pierce	T	C—Ideal	M—Bosch	Stromberg	M—Fuller	S-3	Fuller, TU¾	40
Bessemer, G	1,575	19.6	3½x5	Continental, N	C & S	N	T	C—Ideal	M—Bosch	Zenith	M—Fuller	S-3	Fuller, TU	41
Brinton, H	1,500	16.9	3¼x5	Wisconsin	.....	N	T	T—	M—	.....	M—	S-3	.....	42
Briscoe, T-24	.....	18.2	3½x5	Own	.....	N	.....	—Perfection	S—Conn	Buick	C—Own	S-3	Own	43
Chevrolet, T	1,460	21.7	3¾x5¼	Own	.....	Monarch	P	C—Harrison	M—Remy	Zenith	C—Own	S-3	Warner	44
Chicago, C-1	2,200	19.6	3½x5	Continental, N	C & S	Pierce	P	T—	N—Bosch	Zenith	M—Brown-Lipe	S-3	Brown-Lipe	45
Clydesdale, 32	.....	22.5	3¾x5	Continental, N	C & S	Own	T	T—Own	M—Bosch	Zenith	M—Brown-Lipe	S-3	Brown-Lipe, 30	46
Collier, 18	1,650	19.6	3½x5	Continental	C & S	Monarch	T	T—Chicago	M—Eisemann	Zenith	M—	S-3	Fuller	47
Columbia, F	1,750	22.5	3¾x5	Continental, N	C & S	Pierce	P	T—Long	M—Dixie	Shakespe're	P—Borg & Beck	S-3	Covert	48
Commerce, E	1,590	22.5	3¾x5	Continental, N	C & S	N	T	T—Long	M—Eisemann	Zenith	C—Detroit	S-3	Detroit, C	49
Conestoga	1,850	19.6	3½x5	Continental	C & S	.....	.....	T—Eng. & M	M—Bosch	Zenith	M—Fuller	S-3	Fuller, TU¾	50
Corbitt	2,200	22.5	3¾x5	Continental, N	C & S	Duplex	T	C—Ideal	M—Eisemann	Stromberg	M—Fuller	S-3	Fuller	51
Dart, E	2,100	22.5	3¾x5½	Buda, WU	C	N	T	C—Ideal	M—Eisemann	Zenith	M—Fuller	S-3	Fuller, TU	52
Day-Elder, A	1,775	19.6	3½x5	Continental, N	C & S	N	T	T—Bush	M—Berling	Zenith	M—Covert	S-3	Covert, MUNC	53
Dearborn, C	1,500	23.6	3¾x4½	.....	C	N	T	T—Chicago	M—Dixie	Stromberg	P—	S-3	Grant-Lees	54
Denby, 12	1,950	19.6	3½x5	Continental, N	C & S	Monarch	T	T—Long	M—Eisemann	Stromberg	M—Fuller	S-3	Fuller, TU¾	55
Diamond T, J5	2,360	19.6	3½x5	Continental, N	C & S	Pierce	T	T—G & O	M—Bosch	Stromberg	M—Brown-Lipe	S-3	Brown-Lipe, 30	56
Douglas, C	1,700	19.6	3½x5½	Buda, RU	C & S	N	T	T—Chicago	M—Eisemann	Schebler	M—Fuller	S-3	Fuller, TU¾	57
Famous, B10	1,690	19.6	3½x5	Continental, N	C & S	Monarch	T	T—Chicago	M—Eisemann	Stromberg	M—Fuller	S-3	Fuller, TU¾	58
Federal, S	1,900	22.5	3¾x5	Continental, N	C & S	Monarch	P	Own	M—Eisemann	Zenith	P—Borg & Beck	S-3	Own	59
Ford, T	550	22.5	3¾x4	Own, T	S	N	T	T—Own	M—Own	Holley	M—Own	P-2	Own	60
Forschler	2,000	19.6	3½x5	Continental, N	C & S	Monarch	.....	.....	M—Bosch	Zenith	M—Fuller	S-3	Fuller	61
Gabriel, C	2,000	30.0	4½x5½	Buda, OU	C	Duplex	P	T—G. & O	M—Bosch	Rayfield	P—Borg & Beck	S-3	Brown-Lipe, 50	62
Garford, 75C	2,500	22.5	3¾x5½	Buda, QU	C & S	Simplex	P	T—Own	M—Splitdorf	Rayfield	M—Brown-Lipe	S-3	Brown-Lipe, 50	63
Gary, F	.....	22.5	3¾x5	Continental, N	S	Pierce	T	C—Chicago	M—Eisemann	Master	M—Fuller	S-3	Fuller, TU¾	64
Giant, 15	1,850	19.6	3½x5	Continental, N	S	N	T	C—Ideal	M—Eisemann	Schebler	M—Warner	S-3	Warner, T38G	65
GMC, 21	2,025	22.5	3¾x5	Continental, N	C & S	Monarch	P	T—Own	M—Eisemann	Marvel	M—Own	S-3	Own	66
Hahn, C	1,375	19.6	3½x5	Continental, N	C & S	.....	.....	T—Chicago	M—Eisemann	Stromberg	M—Detroit	S-3	Detroit	67
Higrade, A18	2,100	19.6	3½x5	Continental, N	C & S	Simplex	.....	C—Perfex	M—Eisemann	Zenith	P—Fuller	I-3	Fuller	68
Hoover, 15B	1,435	19.6	3½x5	Continental, N	C & S	.....	T	C—Candler	M—Splitdorf	Schebler	M—Fuller	S-3	Fuller	69
Independent (Iowa)	1,550	19.6	3½x5	Continental, N	C & S	.....	T	T—Chicago	M—Bosch	Stromberg	M—Fuller	S-3	Fuller	70
Ind'p'nd't, F (Ohio)	1,685	19.6	3½x5	Continental, N	C & S	Monarch	.....	T—Chicago	M—Eisemann	Zenith	M—Fuller	S-3	Fuller, TU¾	71
Indiana, 3	2,150	22.5	3¾x5¼	Waukesha, BUX	S	Waukesha	P	T—Long	M—Eisemann	Stromberg	P—Borg & Beck	S-3	Covert, G1	72
International, F	1,850	19.6	3½x5¼	Own	C & S	Own	P	T—Own	M—Bosch	Holley	N—Own	S-3	Own	73
Jones, 31A	1,495	22.5	3¾x5	Continental, N	C & S	N	T	C—Fedders	M—Eisemann	Stromberg	P—Borg & Beck	S-3	Grant-Lees	74
Kleiber, AA	2,400	22.5	3¾x5½	Continental, C4	C & S	Pierce	P	C—Perfection	M—Bosch	Stromberg	M—Hele-Shaw	S-3	Brown-Lipe	75
Larrabee, M	1,950	22.5	3¾x5	Continental, N	C & S	Pierce	T	T—Bush	M—Bosch	Schebler	M—Brown-Lipe	S-3	.....	76
Loyal, 69	1,500	16.9	3¾x5	Herschell-Spill'n	.....	N	T	T—	S—Atwater-K.	Stromberg	M—Borg & Beck	S-3	Covert	77
Myers, 60	1,545	19.6	3½x5	Lycoming, K	C & S	N	T	C—Own	M—Swiss	Carter	M—Mechanics	S-3	Mechanics	78
Napoleon, 9	1,385	19.6	3½x5	Gray	C & S	.....	T	T—Chicago	S—Conn	Stromberg	M—Fuller	S-3	Fuller	79
Nash, 2018	1,650	22.5	3¾x5¼	Own	C	Duplex	P	T—Long	M—Eisemann	Stromberg	P—Borg & Beck	S-3	Detroit, C	80
Nelson & LcM'n, F1	2,250	27.2	4½x5¼	Continental, C4	C & S	Pierce	P	T—Chicago	M—Bosch	Stromberg	M—Brown-Lipe	S-3	Brown-Lipe, 35	81
Niles, B	1,500	19.6	3½x5	Continental, N	C & S	Pierce	.....	.....	M—Eisemann	Stromberg	P—Borg & Beck	S-3	Covert	82
Noble, A20	.....	.....	.....	Buda	C & S	Pierce	.....	T—Chicago	M—Eisemann	Stromberg	M—Fuller	S-3	Fuller, TU¾	83
Ogden, A1	.....	22.5	3¾x5	Continental, N	C & S	Pierce	.....	T—Chicago	M—Bosch	Rayfield	M—Brown-Lipe	S-3	Brown-Lipe	84
Palmer	1,585	22.5	3¾x5	Continental, N	C & S	Pierce	P	C—Fedders	M—Bosch	Stromberg	M—Fuller	S-3	Fuller	85
Rainier, R9	1,875	16.9	3¼x3½	Continental, N	C & S	Monarch	T	C—Harrison	M—Simms	Zenith	M—Brown-Lipe	S-3	Brown-Lipe	86

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TRUCK SPECIFICATIONS — 800—2,000 (Rainier)

Line number.	Final drive (Bevel-gear, Chain, External-gear, Internal-gear, Spur-and-bevel, Worm-gear).	Make of rear axle and model name or number.	Front springs (1, 2, or Full elliptic; Transverse).	Rear springs (Cantilever; 1, 2, or Full elliptic; Transverse.	Make of springs.	Service brake (Contracting, Expanding).	Emergency brake (Contracting, Expanding).	Wheels (Iron, Steel, Wood) and make.	Number and location of driving-wheels (All-around, Front, Rear).	Make of steering-gear.	Frame material Pressed-steel, Rolled-steel, Wood)	Make of frame.	Wheel-base in inches.	Is self-starter furnished? (Yes or No.)	Front tire size in inches (Dual, Pneumatic)	Rear tire size in inches (Dual, Pneumatic)	Brand-name and model name or number.
																	800 Pounds:
1	.....	.....	½	½	Tuthill.....	...	...	.....	2-R	Own.....	....	.....	92	N	28x3	28x3	Pony
																	1,000 Pounds:
2	B	Own.....	½	½	Alloy Steel..	C	E	W—.....	2-R	Own.....	P	Own.....	104	N	31x4	31x4	Briscoe
3	B	.....	.....	.....	.....	E	E	W—.....	2-R	.....	P	.....	100	N	31x4	31x4	Corliss, A
4	B	Timken.....	.....	.....	.....	C	E	.....	2-R	.....	P	.....	108	N	32x4	32x4	Croce, 17
5	B	.....	.....	.....	Detroit.....	..	..	W—.....	2-R	Own.....	..	.....	114	Y	33x4p	33x4p	Dodge
6	.....	.....	C	T	.....	E	..	W—.....	2-R	.....	P	.....	86	N	36x3½p	36x3½p	Duryea, C
7	W	Wisconsin, L.....	½	C	Sheldon.....	E	E	W—Salisbury..	2-R	.....	P	Parish.....	106	Y	30x3½p	30x3½p	Ellsworth, 25A
8	B	Peru.....	.....	.....	.....	..	..	.....	2-R	Lavine.....	..	.....	107	N	30x3½	30x3½	Kearns
9	I	Torbensen.....	½	½	.....	C	E	W—.....	2-R	Ross.....	P	Parish & B.	110	Y	32x4p	32x4p	Loyal
10	B	Adams.....	½	C	Mather.....	E	C	W—Prudden..	2-R	Ditweiler....	P	Savage....	108	N	30x3½p	30x3½p	Seneca, T
11	B	Own.....	.....	.....	Own.....	E	C	W—Kelsey....	2-R	Gemmer.....	P	Own.....	142	N	35x4½	35x4½	Studebaker, SF
12	B	Own.....	½	½	Sheldon.....	C	E	W—Own.....	2-R	Jacox.....	P	Parish.....	108	N	31x4P	31x4P	Vim, 21
																	1,500 Pounds:
13	I	Hess.....	.....	.....	Rowland.....	C	E	W—.....	2-R	Lavine.....	P	Parish.....	118	N	32x4	32x4	Atlas, 19
14	W	Sheldon.....	½	½	Iron City....	E	E	W—Jones.....	2-R	Gemmer.....	P	Savage....	108	Y	33x4p	33x4p	Day-Elder, J
15	I	Torbensen.....	½	½	.....	C	C	W—.....	2-R	.....	....	.....	115	N	34x4½p	35x5p	Diehl, A
16	I	.....	½	½	Tuthill.....	..	..	W—.....	2-R	.....	..	.....	120	N	34x4p	34x4p	Dispatch, G
17	W	Sheldon.....	.....	.....	Delaney.....	E	E	.....	2-R	Ross.....	..	.....	120	N	32x2½	32x3	Forschler
18	C	Sheldon.....	.....	.....	Sheldon.....	..	..	W—.....	2-R	.....	..	.....	96	N	34x2	36x2½	Geneva, 1
19	B	Own.....	½	½	Detroit.....	E	C	W—Hayes....	2-R	Jacox.....	P	Parish.....	132	N	35x5p	35x5p	GMC, 16
20	I	Own.....	½	.....	.....	E	C	W—.....	2-R	Ross.....	....	.....	115	N	36x3	36x3½	International, H
21	B	Own.....	½	½	Mather.....	E	C	W—Prudden...	2-R	Jacox.....	P	Smith.....	135	N	34x4½p	34x4½p	Kissel, Delivery
22	I	Torbensen.....	½	½	.....	C	E	W—.....	2-R	.....	P	Parish & B.	120	Y	32x4½p	32x4½p	Loyal
23	W	Timken, 6456.....	½	½	Tuthill.....	E	E	W—Standard..	2-R	Ross.....	R	Own.....	124	N	34x3½	34x4	Menominee
24	B	Salisbury.....	½	F	Standard....	C	E	W—Salisbury .	2-R	C. A. S.....	R	Own.....	112	Y	33x4	33x4	Old Hickory, M
25	I	Torbensen.....	½	½	.....	E	E	W—.....	2-R	.....	P	.....	128	Y	35x5p	35x5p	Oldsmobile
26	B	Timken.....	½	½	Perfection...	C	E	W—Schwarz...	2-R	Lavine.....	P	Parish.....	125	N	35x4½p	35x4½p	Rainier, R11
27	S	Own.....	.....	.....	Penn.....	E	....	W—.....	2-R	Own.....	P	Own.....	128	Y	34x4½p	34x4½p	Reo, Speedwagon
28	I	Torbensen.....	.....	.....	Mather.....	C	C	W—.....	2-R	Jacox.....	P	Savage....	110	N	32x3	32x3½	Republic, Despatch
29	I	Clark, AS.....	½	½	.....	C	E	W—Wayne....	2-R	C. A. S.....	P	.....	110	Y	32x4p	32x4p	Stewart, 11
30	B	Salisbury.....	½	½	.....	E	C	W—.....	2-R	.....	..	.....	115	Y	33x4p	33x4p	Texan
31	I	Russel.....	.....	.....	Kalamazoo..	E	E	W—Bimel	2-R	Lavine.....	P	Parish & B.	110	N	34x4½	35x4½	Tiffin, A
32	W	.....	½	½	Sheldon.....	E	E	.....	2-R	.....	P	.....	.....	Y	34x4½p	34x4½p	Watson
33	B	Own.....	½	½	.....	C	E	W—.....	2-R	Own.....	P	.....	133½	N	34x4½p	34x4½p	White, 15
34	W	Timken.....	½	½	.....	E	E	W—.....	2-R	.....	P	.....	124	N	34x4½p	34x4½p	White Hickory, E
																	1,000 Pounds:
35	I	Torbensen.....	½	½	Perfection...	C	E	W—Bimel.....	2-R	Ditweiler....	P	Parish.....	115	Y	32x4p	32x4p	Grant, 12
																	2,000 Pounds:
36	W	Timken, 6456.....	½	½	Detroit.....	E	E	W—Hayes....	2-R	Lavine.....	P	Savage....	140	N	36x3½	36x5	Acason, R
37	W	Timken, 6456.....	½	½	Detroit.....	E	E	W—Hayes....	2-R	Ross.....	P	Smith.....	130	N	34x3½	34x5	Acme, B
38	I	Torbensen.....	½	½	Detroit.....	E	E	W—Mutual...	2-R	Ross.....	P	Detroit....	130	N	33x4p	34x4	All-American, A
39	I	Torbensen, OX....	½	½	Detroit.....	C	C	W—.....	2-R	Lavine.....	P	Own.....	130	N	33x4p	32x3½	Apex, C
40	I	Clark, 1B.....	½	½	Higgins.....	C	E	W—Bimel.....	2-R	Lavine.....	P	Parish & B.	124	N	34x3	34x3½	Beck, A
41	I	Torbensen, A.....	½	½	Perfection...	C	E	W—Schwarz...	2-R	Ross.....	P	Savage....	124	N	34x3½	34x4	Bessemer, G
42	W	.....	½	½	.....	C	E	W—.....	2-R	Ross.....	....	Own.....	125	N	33x4½	33x4½	Brinton, H
43	I	Russel.....	½	½	Alloy Steel..	C	E	W—.....	2-R	Lavine.....	P	Parish.....	121	N	34x4	34x4	Briscoe, T-34
44	W	Industrial.....	½	½	Perfection...	C	E	W—Hayes....	2-R	Warner.....	R	Own.....	125	N	33x4	35x5	Chevrolet, T
45	W	Timken	½	½	Mather	E	E	W—.....	2-R	Gemmer	R	.....	132	N	36x3	36x4	Chicago, C-1
46	W	Timken, 6352.....	½	½	Standard.....	E	E	W—.....	2-R	Ross.....	P	Parish & B.	154	N	34x3½	34x5	Clydesdale, 32
47	W	.....	½	½	.....	E	E	W—.....	2-R	Ross.....	P	.....	140	N	34x4	34x5	Collier, 18
48	I	Russel, O.....	½	½	Perfection...	E	E	W—Hayes....	2-R	Own.....	R	Own.....	126	N	32x3	32x4	Columbia, F
49	I	Torbensen, A.....	½	½	Detroit.....	C	E	W—Bimel.....	2-R	Jacox.....	P	Detroit....	126	Y	34x3	34x4	Commerce, E
50	W	Wisconsin, 800G...	½	½	.....	E	E	W—.....	2-R	Ross.....	P	.....	118	N	34x3½	34x5	Conestoga
51	W	Sheldon.....	½	½	Sheldon.....	E	E	W—Bimel	2-R	Lavine.....	P	.....	130	N	34x3½	34x4	Corbitt
52	W	Timken, 6456.....	½	½	Mather.....	E	E	W—Prudden..	2-R	Ross.....	P	Savage....	130	N	34x3½	34x5	Dart, E
53	W	Wisconsin, 800G...	½	½	Iron City....	E	E	W—Jones.....	2-R	Ross.....	P	Savage....	128	N	34x3	34x4	Day-Elder, A
54	I	Torbensen.....	½	½	Cleveland...	C	E	W—Prudden..	2-R	Ditweiler....	R	Dearborn..	125	N	31x4p	35x5p	Dearborn, C
55	I	Russel, P.....	½	½	Detroit.....	C	E	W—Hayes....	2-R	Ross.....	P	Detroit....	124	N	34x3	34x4	Denby, 12
56	W	Timken, 6460.....	½	½	Mather.....	E	E	W—Prudden..	2-R	Gemmer.....	P	Smith.....	132	N	36x3	36x4	Diamond T, J5
57	I	Torbensen, C.....	½	½	Own.....	E	C	W—.....	2-R	Ross.....	R	Own.....	122	N	34x4½	35x5	Douglas, C
58	I	Clark, 1.....	½	½	Detroit.....	C	E	W—Bimel.....	2-R	Ross.....	P	Savage....	120	N	34x3½	34x4	Famous, B10
59	W	Timken, 6456.....	½	½	Mather.....	C	E	W—.....	2-R	Gemmer.....	P	.....	132	N	34x3	34x4	Federal, S
60	W	Own.....	T	T	Own.....	C	E	W—.....	2-R	Own.....	P	Own.....	124	N	30x3½p	32x4½p	Ford, T
61	W	Sheldon.....	.....	.....	Delaney.....	E	E	.....	2-R	Ross.....	....	.....	130	N	34x3	34x4	Forschler
62	W	Timken, 6451.....	½	½	Merrill.....	E	E	W—Standard..	2-R	Gemmer.....	P	Parish.....	136	N	35x5p	35x5p	Gabriel, C
63	W	Timken, 6456.....	½	½	Perfection...	E	E	W—.....	2-R	Ross.....	P	Own.....	128	N	34x4½	36x4	Garford, 75C
64	W	Sheldon, W-1500...	½	½	Tuthill.....	E	E	W—Bimel.....	2-R	Ross.....	P	Parish & B.	130	N	36x3½	36x4	Gary, F
65	W	Timken, 6456.....	½	½	Mather.....	E	E	W—Prudden..	2-R	Jacox.....	R	Hydraulic..	138	N	34x3½p	34x5	Giant, 15
66	W	Timken, 6456.....	½	½	Detroit.....	E	E	W—Hayes....	2-R	Lavine.....	P	Parish.....	136	N	34x3½	34x5	GMC, 21
67	I	Torbensen.....	.....	.....	Delaney.....	..	..	W—.....	2-R	Lavine.....	P	Parish.....	127	N	34x3	34x4	Hahn, C
68	W	Sheldon.....	½	½	Perfection...	E	E	W—Prudden..	2-R	Lavine.....	..	Own.....	115	N	35x5	35x6	Higrade, A18
69	W	Sheldon.....	½	½	Sheldon.....	E	E	W—.....	2-R	Lavine.....	P	Detroit....	120	N	32x4	33x4½	Hoover, 15B
70	I	Russel.....	½	½	.....	C	E	W—.....	2-R	Lavine.....	P	.....	134	N	34x3	34x4	Indep'nd'nt, (Iowa)
71	W	Chicago.....	½	½	.....	E	E	W—Bimel	2-R	Wohlrab	P	.....	128	N	34x3	34x4	Ind'p'nd't, F(Ohio)
72	W	Own.....	½	½	.....	E	E	W—Bimel	2-R	Wohlrab	R	Own.....	135	N	34x3½	34x4	Indiana, 3
73	I	Own.....	½	½	.....	E	E	W—.....	2-R	Ross.....	P	.....	128	N	36x3½	36x4	International, F
74	I	Russel, O.....	½	½	Standard....	C	E	W—Prudden..	2-R	C. A. S.....	P	Hydraulic..	130	N	34x3½	34x4	Jones, 31A
75	W	Timken.....	.....	.....	Betts.....	C	E	W—.....	2-R	Ross.....	R	Own.....	130	N	34x3½	34x5	Kleiber, AA
76	W	Sheldon, W1500...	½	½	Merrill.....	E	E	W—Hoopes...	2-R	Ross.....	P	Savage....	130	N	34x3½	34x5	Larrabee, M
77	I	Torbensen.....	½	½	.....	C	E	W—.....	2-R	.....	P	Parish & B.	130	Y	33x5p	33x5p	Loyal, 69
78	W	Chicago.....	½	½	Cleveland...	C	E	W—Eberly....	2-R	C. A. S.....	P	Parish & B.	130	Y	34x3½	34x4	Myers, 60
79	I	Clark.....	½	½	Mather.....	C	C	W—.....	2-R	Lavine.....	R	Own.....	133	N	32x3½	32x4	Napoleon, 9
80	I	Clark, 1.....	½	½	Alloy Steel..	C	C	W—Auto&Bim	2-R	Jacox.....	P	Smith.....	130	Y	34x3	34x4	Nash, 2018
81	W	Timken, 6460.....	½	½	Tuthill.....	E	E	W—Prudden..	2-R	Lavine.....	R	Own.....	.....	N	36x3½	36x5	Nelson & LeM'n, F1
82	W	Timken.....	.....	.....	.....	E	E	.....	2-R	Gemmer.....	....	.....	124	N	35x5	35x5	Niles, B
83	W	Sheldon, W15.....	½	½	Tuthill.....	E	E	W—Bimel.....	2-R	Lavine.....	P	Parish & B.	144	N	36x3½	36x4	Noble, A20
84	W	Timken.....	½	½	.....	E	E	W—.....	2-R	Gemmer.....	P	.....	136	N	36x3	36x4	Ogden, A1
85	I	Torbensen.....	.....	.....	Champion...	E	....	W—.....	2-R	Ross.....	P	Parish & B.	132	N	34x3½	34x4	Palmer
86	W	Sheldon.....	½	½	Perfection...	C	E	W—Schwarz...	2-R	Lavine.....	P	Parish.....	125	N	32x4	32x4	Rainier, R9

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2,000 (Republic)—3,000 (Schwartz) INTERNAL-COMBUSTION

Brand-name and model name or number.	Price f. o. b. factory with seat and tires but without body.	Horse-power rating by S. A. E. formula.	Bore and stroke of engine in inches.	Make of engine and model name or number.	Lubrication (Circulating, Splash).	Make of governor (N indicates None).	Water-circulation (Pump, Thermo-siphon).	Radiator (Cellular, Tubular) and make.	Ignition system (Dry Cells, Magneto, Storage battery) and make of magneto.	Make of carbureter.	Clutch (Cone, Multiple-disk, Plate) and make.	Transmission (Individual-clutch, Planetary, Sliding-gear) and number of forward speeds.	Make of transmission and model name or number.	Line number.
2,000 Pds.—Con.														
Republic, 10	$1,595	22.5	3½x5	Continental, N..	C & S	Ruggles	T	C—G & O	M—Eisemann	Stromberg	M—Fuller	S-3	Fuller	1
Royal	2,400	16.9	3¼x5	Wisconsin		Monarch	T	T—Kells	M—Bosch	Stromberg	P—Borg & Beck	I-3	Own	2
Service, 220	2,245	19.6	3½x5½	Buda, RU	C	N	T	T—Long	M—Eisemann	Stromberg	M—Fuller	S-3	Fuller, TU	3
Signal, F	2,400	27.2	4½x5¼	Continental, C4	C & S	Pierce	T	T—McCord	M—Eisemann	Stromberg	M—Brown-Lipe	S-4	Brown-Lipe, 35..	4
Stewart, 8	1,650	19.6	3½x5	Continental, N..	C & S	N	T	T—Bush	M—Eisemann	Zenith	P—Borg & Beck	S-3	Durston	5
Studebaker, 7		24.2	3½x5	Continental, N..	C & S	Pierce	P	C—McCord	M—Remy	Schebler	C—Own	S-3	Own	6
Superior, D	1,600	22.5	3¾x5	Continental, N..	C & S	Pierce	T	C—Ideal	M—Eisemann	Stromberg	M—Fuller	S-3	Fuller, TU¾	7
Transport, 20	1,650	22.5	3¾x5	Continental, N..	C & S	Simplex	T	C—	M—Eisemann	Stromberg	M—Fuller	S-3	Fuller	8
Vim, 25	2,195	22.5	3¾x5½	Hercules	C	N	T	T—McCord	M—Dixie	Zenith	M—Brown-Lipe	S-3	Brown-Lipe, 30..	9
Wilcox, A		22.5	3¾x5½	Buda	S	Pierce	P	T—Own	M—Bosch	Stromberg	M—Own	S-3	Brown-Lipe, 30..	10
Wilson, F	1,750	19.6	3½x5	Continental, N..	C & S	Pierce	T	C—Own	M—Eisemann	Stromberg	P—Borg & Beck	S-3	Covert, C-H	11
Witt-Will, WD-16		22.5	3¾x5¼	Continental, C4	C & S	Pierce	P	T—National	M—Eisemann	Zenith	M—Brown-Lipe	S-3	Brown-Lipe	12
3,500 Pounds:														
Hahn, C	1,950	27.2	4½x5¼	Continental, C4..	C & S	Pierce	P	T—Chicago	M—Bush	Stromberg	M—Brown-Lipe	S-3	Brown-Lipe	13
Koehler, K	1,450	19.6	3½x5	Own		Simplex	T	T—Own	M—Eisemann	Stromberg	M—	S-3		14
Old Hickory, W	2,175	22.5	3¾x5	Continental, N..	C & S	Pierce	T	T—Long	M—Eisemann	Stromberg	P—Borg & Beck	S-3	Grant-Lees, 515	15
Oneida, A-9	1,985	22.5	3¾x5¼	Own	C & S	Own	P	T—Modine	M—Bosch	Stromberg	M—Own	S-3	Own	16
3,000 Pounds:														
Acason, RB		22.5	3¾x5¼	Waukesha, BUX	S	Waukesha	P	C—National	M—Eisemann	Schebler	M—Fuller	S-3	Fuller, TU¾	17
Ace	2,800	28.9	4¼x5½	Buda, HU	C	Pierce	P	C—Modine	S—Atwater-K	Schebler	M—Brown-Lipe	S-4	Brown-Lipe	18
Acme, F	2,175	22.5	3½x5	Continental, N..	C & S	Duplex	T	T—G & O	M—Eisemann	Rayfield	P—Borg & Beck	I-3	Cotta, BUC	19
Apex, D	1,420	19.6	3½x5	Buda	C & S	N	T	C—	S—Autolite	Stromberg	M—Fuller	S-3	Ful er, TU¾	20
Atterbury, 7R	2,575	27.2	4½x5½	Continental, C4..	C & S	Monarch	P	T—Long	M—Eisemann	Zenith	M—Brown-Lipe	S-4	Brown-Lipe, 35..	21
Beck, B	1,945	22.5	3½x5	Continental, N..	C & S	Pierce	T	C—Ideal	M—Bosch	Stromberg	M—Fuller	S-3	Fuller, ¾ TU	22
Bell		19.6	3½x5½	Buda, RU	C	Duplex	T	T—Chicago	M—Eisemann	Stromberg	P—Borg & Beck	S-3		23
Bessemer, H	1,945	22.5	3¾x5	Continental, N..	C & S	N	T	C—Ideal	M—Bosch	Zenith	P—Borg & Beck	S-3	Brown-Lipe, 35..	24
Bethlehem, D	1,965	22.5	3¾x4¼	Own	C & S	Monarch	T	C—Fedders	S—	Schebler	P—Borg & Beck	S-3	Detroit, DX	25
Brockway, S	2,100	22.5	3¾x5	Continental, N..	C & S	N	T	T—Bush	M—Eisemann	Schebler	M—Brown-Lipe	S-3	Brown-Lipe, 30..	26
Chicago, C-1½	2,600	22.5	3¾x5	Continental, N..	C & S	Pierce	T	T—	M—Bosch	Zenith	M—Brown-Lipe	S-3	Brown-Lipe	27
Clydesdale, 42		22.5	3¾x5	Continental, N..	C & S	Own	T	T—Own	M—Bosch	Zenith	M—Brown-Lipe	S-3	Brown-Lipe	28
Collier, 19	1,850	22.5	3¾x5	Continental, N..	C & S	Monarch	P	T—Chicago	M—Eisemann	Zenith	M—Fuller	S-3	Fuller	29
Comet	1,750	19.6	3½x5	Lycoming, K	S	N	T	C—Standard	M—Dyneto	Carter	P—Borg & Beck	S-3	Muncie, T25	30
Concord, A	2,350	22.5	3¾x5½	Buda		Monarch	T	T—Bush	M—Eisemann	Zenith	M—Brown-Lipe	S-3	Brown-Lipe	31
Corbitt, D	2,600	22.5	3¾x5	Continental, N..	C & S	Duplex	T	C—Ideal	M—Eisemann	Stromberg	M—Fuller	S-3	Fuller	32
Day-Elder, B	2,075	22.5	3¾x5	Continental, N..	C & S	N	T	T—Bush	M—Berling	Zenith	M—Covert	S-3	Covert, MUNC	33
Dearborn, F	1,980	22.5	3¾x5	Continental, N..	C & S	N	T	T—Chicago	M—Bosch	Stromberg	M—Fuller	S-3	Fuller	34
Dependable		22.5	3¾x5½	Buda	C & S		T	T—	M—Dixie	Stromberg	M—	S-3		35
Diamond T, J4	2,755	22.5	3¾x5	Continental, N..	C & S	Pierce	T	T—G & O	M—Bosch	Stromberg	M—Brown-Lipe	S-3	Brown-Lipe, 30..	36
Diamond T, FS	2,445	22.5	3¾x5¼		C & S	Pierce	P	T—G & O	M—Bosch	Stromberg	M—	S-3		37
Douglas, TA	2,000	27.2	4½x5	Buda		Pierce	P	T—Chicago	M—Eisemann	Schebler	P—Fuller	S-3	Fuller, TU3	38
Famous, C	2,250	22.5	3¾x5	Continental, N..	C & S	Monarch	P	T—Chicago	M—Eisemann	Stromberg	M—Fuller	S-3	Fuller, TU¾	39
Federal, T	2,350	27.2	4½x5½	Continental, C4..	C & S	Monarch	P	T or C—Own	M—Eisemann	Zenith	P—Borg & Beck	S-4	Own	40
Forschler	2,375	19.6	3½x5	Continental, N..	C & S	Monarch			M—Bosch	Zenith	M—Fuller	S-3	Fuller	41
Frontmobile, FM1½	1,750	16.9	3¼x5	Herschell-Spill'n	C & S		T	C—Own	M—Bosch	Zenith	P—Borg & Beck	S-3	Own	42
Gary, G		28.9	4¼x5½	Buda, HU	C	Pierce	P	T—Chicago	M—Eisemann	Master	M—Fuller	S-3	Fuller, TU3	43
Giant, 14	2,400	19.6	3½x5	Continental, N..	C & S		T	C—Ideal	M—Eisemann	Schebler	M—Warner	S-3	Warner	44
GMC, 31	2,500	22.5	3¾x5	Continental, N..	C & S	Monarch	P	T—Own	M—Eisemann	Marvel	M—Own	S-4	Own	45
Gramm-Bernst'n 15	1,995	22.5	3¾x5	Continental, N..	C & S	N	T	T—Own	S—North East	Stromberg	M—Fuller	S-3	Fuller	46
Grant, 10	1,885	22.5	3¾x5	Continental, N..	C & S	Pierce	T	C—Fedders	M—Splitdorf	Carter	P—Borg & Beck	S-3	Grant-Lees, 515..	47
Grant, L	1,935	22.5	3¾x5	Continental, N..	C & S	Pierce	T	C—Fedders	M—Eisemann	Carter	P—Borg & Beck	S-3	Grant-Lees, 515..	48
Hawkeye, K	1,995	22.5	3¾x5½	Buda		Simplex	T	C—Ideal	M—Dixie	Zenith	M—Fuller	S-3	Fuller	49
Huffman, C (int.)	1,695	22.5	3¾x5	Continental	C		T	C	M—Dixie	Zenith	M—Fuller	S-3	Fuller	50
Huffman, B (worm)	1,895	22.5	3¾x5	Continental	C		T	C	S—North East	Zenith	M—Fuller	S-3	Fuller	51
Independent (Iowa)	1,890	22.5	3¾x5	Continental, N..	C & S		T	T—Chicago	M—Bosch	Stromberg	M—Fuller	S-3	Fuller	52
Indiana, Q	2,600	27.2	4½x5½	Rutenber, 38	C	Pierce	P	T—Long	M—Eisemann	Stromberg	P—Borg & Beck	S-4	Brown-Lipe, 35..	53
International, K	2,200	19.6	3½x5¼	Own	C & S	Own	P	T—Own	M—Bosch	Holley	M—Own	S-3	Own	54
Kalamazoo, G	2,500	22.5	3¾x5	Continental, N..	C & S	Pierce	T	C—Hooven	S—Conn	Stromberg	M—Fuller	S-4	Fuller, G	55
Kearns	1,800	16.9	3¼x5	Herschell-Spill'n					S—Conn		P—Borg & Beck	S-3	Grant-Lees	56
Kelly-Spr'gf'd, K31	3,000	22.5	3¾x5¼	Own, K30	C	Own	P	C—Own	M—Eisemann	Zenith	C—Own	S-3	Covert, GI	57
Kelly-Spr'gf'd, K32	3,000	22.5	3¾x5¼	Own, K30	C	Own	P	C—Own	M—Eisemann	Zenith	C—Own	S-3	Covert, GI	58
Kimball, 2A		25.6	4 x5	Wisconsin		Simplex	P	C—Flexo	M—Eisemann	Master	M—Brown-Lipe	S-4	Brown-Lipe	59
King-Zeitler	2,450	22.5	3¾x5	Continental, N..	C & S		T	T—Chicago	M—Bosch	Stromberg	M—Brown-Lipe	S-3	Brown-Lipe, 35..	60
Kissel, Utility	2,074	24.0	3¾x5½	Own, 4-32	C & S	Pierce	P	T—McCord	M—Eisemann	Stromberg	M—Warner	S-3	Warner	61
Kleiber, A	2,650	27.2	4½x5½	Continental, C4	C & S	Pierce	P	C—Perfex	M—Bosch	Stromberg	M—Hele-Shaw	S-3	Brown-Lipe	62
Maccar, L	2,750	27.2	4½x5¼	Continental, C4..	C & S	Pierce	P	T—Own	M—Bosch	Stromberg	M—Brown-Lipe	S-3	Brown-Lipe, 35..	63
Mack, AB (chain)	3,000	25.6	4 x5	Own	C & S	Own	P	C—El Arco	M—Splitdorf	Zenith	M—Brown-Lipe	S-4	Brown-Lipe	64
Mack, AB (worm)	3,000	25.6	4 x5	Own	C & S	Own	P	C—El Arco	M—Splitdorf	Zenith	M—Brown-Lipe	S-4	Brown-Lipe	65
Manly, 30	2,050	22.5	3¾x5¼	Waukesha, BUX	S	Waukesha		T—Chicago	M—Eisemann	Zenith	M—	S-4		66
Mapleleaf, AA		22.5	3¾x5		C & S				M—		P—	S-3		67
Master, JI	2,190	27.2	4½x5½	Buda, OU	S	McCanna	P	T—Chicago	M—Eisemann	Master	M—Fuller	S-3	Fuller, TU3	68
Master, JW	2,290	27.2	4½x5½	Buda, OU	S	McCanna	P	T—Chicago	M—Eisemann	Master	M—Fuller	S-3	Fuller, TU3	69
Maxwell	1,185	21.0	3¾x4½	Own	C & S	N	T	T—Own	S—Atwater-K	Johnson	C—Own	S-3	Own	70
Menominee		22.5	3¾x5¼	Continental, C4	C & S	Monarch	P	C—G & O	M—Eisemann	Stromberg	M—Fuller	S-3	Fuller, TU2	71
Moreland, 19B	2,930	27.2	4½x5¼	Continental, C2	C & S	N	P	C—Own	M—Dixie	Miller	M—Own	S-4	Own, 50	72
Myers, 80	1,875	19.6	3½x5	Lycoming, K	C & S	N	T	T—Own	M—Swiss	Carter	P—Borg & Beck	S-3	Grant-Lees	73
Napoleon, 11	1,660	19.6	3½x5	Gray	C & S	N	T	T—Chicago	S—Conn	Stromberg	M—Fuller	S-3	Fuller	74
Nelson & LeM, 71½	2,425	27.2	4½x5¼	Continental, C4	C & S	Pierce	P	T—Chicago	M—Bosch	Stromberg	M—Brown-Lipe	S-3	Brown-Lipe, 35..	75
Noble, B30				Buda	C & S	Pierce		T—Chicago	M—Eisemann	Stromberg	M—Fuller	S-3	Fuller, LTU	76
Norwalk	1,750	19.6	3½x5	Lycoming K	C & S	N	T	C—Standard	S—	Carter	P—Borg & Beck	S-3	Grant-Lees, 515..	77
Old Hickory, N	995	19.6	3½x5	Lycoming K			T	T—Candler	M—Conn	Carter	C—Lycoming	S-3	Grant-Lees	78
O. K., 1½T	2,450	27.2	4½x5½	Buda	C & S	Pierce	P	T—Chicago	M—Eisemann	Zenith	M—Muncie	S-3	Muncie	79
Old Reliable, W15	2,350	25.6	4 x5	Wisconsin, EU	C	N	P	T—Chicago	M—Bosch	Stromberg	M—Brown-Lipe	S-3	Brown-Lipe, 35..	80
Packard, 1½E	3,200	25.6	4 x5½	Own	C	Own	P	C—	M—Dixie	Own	M—Own	S-4	Own	81
Patriot, Lincoln	2,150	22.5	3¾x5	Continental, N..	C & S	Pierce	T	T—Bremer	M—Bosch	Stromberg	P—Borg & Beck	S-3	Covert, MA	82
Rainier, R6	1,975	19.6	3½x5	Continental, N..	C & S	Monarch	T	C—Harrison	M—Simms	Zenith	M—Brown-Lipe	S-3	Brown-Lipe	83
Reliance	2,500	27.2	4½x5½	Buda, OU	S	Pierce	T		M—Bosch	Stromberg	M—Fuller	S-3	Fuller	84
Republic, 11X	1,885	22.5	3¾x5	Continental, N..	C & S	Ruggles	T	C—G & O	M—Eisemann	Stromberg	M—Fuller	S-3	Fuller	85
Royal	2,800	22.5	3¾x5	Wisconsin		Monarch	P	T—Kells	M—Bosch	Stromberg	P—Borg & Beck	I-3	Own	86
Sandow, CG	2,090	22.5	3¾x5	Continental, N..	C & S	N	T	T—Chicago	M—Eisemann	Stromberg	M—Fuller	S-3	Fuller, TU	87
Sandow, CG	2,000	19.6	3½x5	Continental, N..	C & S	N	T	T—Chicago	M—Eisemann	Stromberg	M—Fuller	S-3	Fuller, TU	88
Schwartz, B	2,175	22.5	3¾x5	Continental, N..	C & S	Pierce	T	C—Fedders	M—Bosch	Stromberg	M—Brown-Lipe	S-3	Brown-Lipe, 35..	89

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TRUCK SPECIFICATIONS

2,000 (Republic)—3,000 (Schwartz)

Line number.	Final drive (Bevel-gear, Chain, External-gear, Internal-gear, Spur-and-bevel, Worm-gear).	Make of rear axle and model name or number.	Front springs (S, 1, or Full elliptic; Transverse).	Rear springs (Cantilever; S, 1, or Full elliptic; Transverse.	Make of springs.	Service brake (Contracting, Expanding).	Emergency brake (Contracting, Expanding).	Wheels (Iron, Steel, Wood) and make.	Number and location of driving-wheels (All-around, Front, Rear).	Make of steering-gear.	Frame material Pressed-steel, Rolled-steel, Wood).	Make of frame.	Wheel-base in inches.	Is self-starter furnished? (Yes or No.)	Front tire size in inches (Dual, Pneumatic)	Rear tire size in inches (Dual, Pneumatic)	Brand-name and model name or number.
																	2,000 Pds.—Con.
1	I	Torbensen, A.. ..	½	½	Mather.....	C	E	W—Prudden..	2-R	Jacox.....	P	Savage....	124	N	34x3	34x4	Republic, 10
2	W	Timken.....	.....	.....	Merrill.....	E	E	W—.....	2-R	Ross.....	P	Own.....	128	N	34x4	34x5	Royal
3	W	Timken, 6456.....	½	½	.....	E	E	W—Bimel....	2-R	Ross.....	P	Savage....	137	N	34x3½	34x5	Service, 220
4	W	Timken ,6456.....	½	½	Perfection...	E	E	W—Hayes....	2-R	Ross.....	P	Savage....	146	N	34x3½	36x5	Signal, F
5	I	Clark, I.....	½	½	.....	E	C	W—Wayne....	2-R	Gemmer.....	P	.....	130	N	34x3½	34x4	Stewart, 8
6	B	Own.....	.....	.....	Own.....	E	C	W—.....	2-R	.....	...	.....	125	N	35x5	35x5	Studebaker, 7
7	I	Torbensen, A.....	½	½	Tuthill.....	E	E	W—Schwarz...	2-R	C. A. S.....	P	Savage....	124	N	34x4½p	34x4½	Superior, A
8	I	Clark.....	.....	.....	Detroit.....	...	...	.....	2-R	Jacox.....	...	.....	130	N	34x3½	34x4	Transport, 20
9	W	Sheldon.....	½	½	Sheldon.....	E	E	W—Own.....	2-R	Jacox.....	P	Own.....	120	N	35x5p	35x5p	Vim, 25
10	W	Wisconsin, 800G...	½	½	Sheldon.....	E	E	W—Bimel.....	2-R	Own.....	P	Smith.....	130	N	36x4	36x4	Wilcox, A
11	W	Timken, 6456.....	½	½	Perfection...	E	E	W—Bimel.....	2-R	Lavine.....	P	Own.....	124	N	35x5p	35x5p	Wilson, F
12	W	Timken.....	.....	.....	.....	E	E	W—.....	2-R	Ross.....	P	.....	120	N	36x3	36x4	Witt-Will, WD-16
																	2,500 Pounds:
13	W	Timken.....	.....	.....	Delaney.....	...	...	W—.....	2-R	Lavine.....	P	Parish.....	135	N	36x3½	36x5	Hahn, C
14	I	Torbensen.....	.....	.....	Mather.....	C	E	W—.....	2-R	Own.....	R	Own.....	129	N	34x3	34x4	Koehler, K
15	W	Timken, 6453.....	½	½	Standard....	C	E	W—Standard..	2-R	Lavine.....	R	Own.....	135	N	36x3½	36x4	Old Hickory, W
16	W	Own.....	½	½	Mather.....	E	E	W—.....	2-R	Ross.....	P	Own.....	135	N	36x3½	36x5	Oneida, A-9
																	3,000 Pounds:
17	W	Timken, 6460.....	½	½	Iron City....	E	E	W—Hayes....	2-R	Ross.....	P	Savage....	142	N	36x3½	36x5	Acason, RB
18	W	Timken.....	½	½	Mather.....	E	E	S—.....	2-R	Ross.....	P	Parish & B.	156	Y	36x4	36x7	Ace
19	W	Timken, 6460.....	½	½	Detroit.....	E	E	W—Hayes....	2-R	Ross.....	R	Smith.....	141	N	34x3½	34x5	Acme, F
20	I	Torbensen, A.....	½	½	Detroit.....	C	E	W—.....	2-R	Lavine.....	R	Own.....	130	N	32x3½	32x4	Apex, D
21	W	Timken, 6552.....	½	½	Spring Perch.	E	E	W—Bimel.....	2-R	Gemmer.....	P	Savage....	140½	N	36x3½	36x5	Atterbury, 7R
22	I	Clark, 1.....	½	½	Higgins.....	C	E	W—Bimel.....	2-R	Lavine.....	P	Parish & B.	144	N	34x3½	34x5	Beck, B
23	I	Russel.....	½	½	.....	C	E	W—.....	2-R	.....	...	.....	132	N	32x3½	32x4	Bell
24	I	Torbensen, C.....	½	½	Perfection...	E	E	W—Schwarz...	2-R	Ross.....	P	Parish & B.	144	N	36x3½	36x5	Bessemer, H
25	I	Russel, PA.....	½	½	Sheldon.....	C	E	W—Wayne....	2-R	Lavine.....	P	Detroit...	136	Y	34x3½	34x5	Bethlehem, D
26	W	Sheldon.....	½	½	Merrill.....	E	E	W—Hoopes...	2-R	Gemmer.....	P	Parish.....	140	N	36x3½	36x5	Brockway, S
27	W	Timken.....	½	½	Mather.....	E	E	W—.....	2-R	Gemmer.....	R	.....	154	N	36x3½	36x5	Chicago, C-1½
28	W	Timken.....	½	½	Perfection...	E	E	W—.....	2-R	Ross.....	P	Parish & B.	146	N	36x3½	36x5	Clydesdale, 42
29	W	.....	½	½	.....	E	E	W—.....	2-R	Ross.....	...	.....	144	N	36x4	36x6	Collier, 19
30	W	Standard, B.....	½	½	Salisbury....	E	E	W—Bimel.....	2-R	C. A. S.....	P	Parish & B.	130	Y	34x4p	34x4	Comet
31	W	Timken.....	½	½	Perfection...	E	E	W—.....	2-R	Ross.....	P	Parish & B.	140	N	36x3½	36x5	Concord, A
32	W	Sheldon.....	½	½	Sheldon.....	E	E	W—Bimel.....	2-R	Ross.....	P	.....	138	N	36x3½	36x5	Corbitt, D
33	W	Wisconsin, 800H..	½	½	Iron City....	C	E	W—Jones.....	2-R	Ross.....	P	Savage....	144	N	34x3½	34x5	Day-Elder, B
34	W	Standard, C2.....	½	½	Tuthill.....	E	E	W—Prudden..	2-R	Lavine.....	P	Smith.....	126	N	34x4	34x5	Dearborn, F
35	W	.....	½	½	.....	E	E	W—.....	2-R	.....	...	.....	128	N	34x3½	34x5	Dependable
36	W	Timken, 6460.....	½	½	Mather.....	E	E	W—Prudden..	2-R	Gemmer.....	P	Smith.....	154	N	36x3½	36x5	Diamond T, J4
37	W	Timken, 6460.....	½	½	Mather.....	E	E	W—Schwarz..	2-R	Gemmer.....	P	Smith.....	144	N	36x3½	36x5	Diamond T, FS
38	I	Torbensen.....	½	½	Own.....	E	C	W—.....	2-R	Ross.....	R	Own.....	127	N	34x3½	34x5	Douglas, TA
39	I	Clark, 1.....	½	½	Spring Perch.	E	C	W—Bimel.....	2-R	Ross.....	P	Savage....	138	N	36x4	36x5	Famous, B12
40	W	Timken, 6552.....	½	½	Mather.....	E	E	W—.....	2-R	Gemmer.....	T	.....	144	N	36x3½	36x5	Federal, T
41	W	Sheldon.....	.....	.....	Delaney.....	E	E	.....	2-R	Ross.....	....	.....	138	N	34x3½	34x5	Forschler
42	W	Own.....	½	½	.....	E	E	W—Schwarz...	2-F	Own.....	R	Own.....	136	N	36x4	36x4	Frontmobile, FM 1½
43	W	Sheldon, W-102...	½	½	Tuthill.....	C	E	W—Hayes....	2-R	Ross.....	P	Parish & B.	144	N	36x3½	36x5	Gary, G
44	W	Timken.....	.....	.....	Mather.....	E	E	W—.....	2-R	Jacox.....	P	Hydraulic..	138	N	34x3½	34x5	Giant, 14
45	W	Timken, 6460.....	½	½	Detroit.....	E	C	W—Hayes....	2-R	Jacox.....	P	Parish.....	130	N	36x3½	36x5	GMC, 31
46	I	Clark, 1.....	½	½	.....	E	C	W—.....	2-R	Ross.....	P	.....	138	N	36x3½	36x5	Gramm-Bernst'n, 1½
47	I	Torbensen, A.....	½	½	Perfection...	C	E	W—Bimel.....	2-R	Jacox.....	P	Savage....	124	Y	34x4½p	34x5	Grant, 10
48	I	Torbensen, A.....	½	½	Perfection...	C	E	W—Bimel.....	2-R	Jacox.....	P	Savage....	140	Y	34x4½p	34x5	Grant, L
49	I	Clark.....	.....	.....	Detroit.....	...	C	W—Bimel.....	2-R	Ross.....	R	Own.....	148	N	34x3½	34x5	Hawkeye, K
50	I	Torbensen.....	½	½	Perfection...	E	C	W—.....	2-R	Lavine.....	P	.....	140	N	34x3½	34x5	Huffman, C (int.)
51	W	.....	½	½	Perfection...	E	E	W—.....	2-R	Lavine.....	P	.....	140	N	34x3½	34x5	Huffman, B (worm)
52	I	Torbensen.....	½	½	.....	C	E	W—.....	2-R	Lavine.....	P	.....	135	N	34x3½	34x5	Independent(Iowa)
53	W	Sheldon, W103....	½	½	.....	E	E	W—Bimel.....	2-R	Wohlrab.....	R	Own.....	144	N	36x3½	36x5	Indiana, Q
54	I	Own.....	½	½	.....	E	C	W—.....	2-R	Ross.....	P	.....	128	N	36x3½	36x5	International, K
55	W	Wisconsin, 800H...	½	½	Kalamazoo..	E	C	W—Bimel.....	2-R	Ross.....	R	Own.....	144	Y	34x4	34x5	Kalamazoo, G
56	.....	Wisconsin.....	.....	.....	.....	...	...	.....	2-R	Lavine.....	....	.....	136	N	34x3½	34x5	Kearns
57	C	Own.....	½	½	Perfection...	E	E	W—.....	2-R	Gemmer.....	P	Own.....	144	N	36x3½	36x6	Kelly-Sp'ngfi'd, K31
58	W	Own.....	½	½	Perfection...	E	E	W—.....	2-R	Gemmer.....	P	Own.....	144	N	36x3½	36x3	Kelly-Sp'ngfi'd, K32
59	W	Sheldon.....	.....	.....	.....	E	E	S—.....	2-R	Lavine.....	P	.....	.....	N	36x3½	36x5	Kimball, 2A
60	W	Timken, 6460.....	½	½	Tuthill.....	E	E	W—St. Mary's	2-R	Lavine.....	R	Own.....	134	N	36x3½	36x6	King-Zeitler
61	W	Sheldon, W15.....	½	½	Mather.....	E	E	W—Prudden..	2-R	Jacox.....	P	Smith.....	152	N	36x3½	36x5	Kissel, Utility
62	W	Sheldon.....	½	½	Betts.....	C	E	W—.....	2-R	Ross.....	R	Own.....	140	N	36x3½	36x6	Kleiber, A
63	W	Timken, 6451.....	½	½	Merrill.....	C	E	W—Schwarz...	2-R	Ross.....	P	Parish.....	150	N	36x4	36x5	Maccar, L
64	C	Own.....	½	½	Merrill.....	E	E	W—Schwarz..	2-R	Gemmer.....	P	Own.....	Opt'nal	N	36x4	36x3½d	Mack, AB (chain)
65	W	Timken or Sheldon.	½	½	Merrill.....	E	E	W—Schwarz..	2-R	Gemmer.....	P	Own.....	Opt'nal	N	36x4	36x3½d	Mack, AB (worm)
66	W	Wisconsin, 800H..	.....	.....	.....	E	C	W—.....	2-R	Lavine.....	....	.....	144	N	36x4	36x5	Manly, 30
67	W	.....	½	½	.....	...	...	W—.....	2-R	.....	P	.....	136	N	34x3½	34x5	Mapleleaf, AA
68	I	Torbensen.....	½	½	Detroit.....	C	E	W—Prudden..	2-R	Ross.....	P	Parish & B.	142	N	34x3½	34x5	Master, JI
69	W	Timken.....	½	½	Detroit.....	E	E	W—Prudden..	2-R	Ross.....	P	Parish & B.	142	N	34x3½	34x5	Master, JW
70	W	Own.....	½	½	Sheldon.....	E	E	W—Hayes....	2-R	Own.....	P	Hydraulic..	124	N	34x4½	34x4½	Maxwell
71	W	Timken, 6552.....	½	½	Tuthill.....	E	E	W—Standard..	2-R	Ross.....	R	Own.....	130	N	36x3½	36x5	Menominee
72	W	Timken, 6456.....	½	½	U. S.....	E	E	I—Smith....	2-R	Ross.....	P	Smith.....	126	N	36x3½	36x5	Moreland, 19B
73	W	Chicago.....	½	½	Cleveland...	E	C	W—Eberly....	2-R	C. A. S.....	P	Parish & B.	144	Y	34x3½	34x5	Myers, 80
74	I	Clark.....	½	½	Mather.....	C	E	W—.....	2-R	Lavine.....	R	Own.....	133	N	34x3½	34x5	Napoleon, 11
75	W	Timken, 6552.....	½	½	Tuthill.....	E	E	W—Prudden..	2-R	Lavine.....	R	Own.....	.....	N	36x3½	36x6	Nelson&LeM'n, 71½
76	W	Sheldon, W103....	½	½	Tuthill.....	E	E	W—Bimel.....	2-R	Lavine.....	P	Parish & B.	144	N	36x3½	36x5	Noble, B30
77	W	Chicago, C.....	½	½	Standard....	E	E	W—Eberly....	2-R	Lavine.....	P	Parish & B.	130	Y	34x3½	34x5	Norwalk
78	B	Salisbury.....	.....	.....	Tuthill.....	C	E	W—Bimel.....	2-R	Lavine.....	R	Own.....	112	N	33x4	33x4	Old Hickory, N
79	W	Chicago.....	½	½	Tuthill.....	C	E	W—Bimel	2-R	Ross.....	P	Detroit....	146	N	36x3½	36x5	O. K., 1½T
80	W	Sheldon, 21.....	½	½	Sheldon.....	E	E	W—Prudden..	2-R	Ross.....	P	Savage....	138	N	34x4	36x6	Old Reliable, W15
81	W	Own.....	½	½	.....	E	E	W—Bimel.....	2-R	.....	R	Own.....	126	N	34x3½	34x3½d	Packard, 1½E
82	I	Russel, O.....	½	½	.....	C	E	W—.....	2-R	Gemmer.....	P	.....	135	N	38x4	38x4	Patriot, Lincoln
83	W	Sheldon.....	½	½	Perfection...	C	E	W—Schwarz...	2-R	Lavine.....	P	Parish.....	133	N	34x3	34x4	Rainier, R6
84	.....	.....	½	½	Sheldon.....	...	...	W—.....	2-R	Ross.....	...	.....	150	N	36x3½	36x5	Reliance
85	I	Torbensen, C2....	½	½	Mather.....	C	E	W—Prudden..	2-R	Jacox.....	P	Savage....	144	N	34x3½	34x5	Republic, 11X
86	W	Timken.....	.....	.....	Merrill.....	E	E	W—.....	2-R	Ross.....	R	Own.....	128½	N	34x4	34x5	Royal
87	W	Sheldon.....	½	½	Garden City.	E	E	W—Prudden...	2-R	Ross.....	P	Savage....	138	N	34x3½	34x5	Sandow, CG
88	W	Sheldon.....	½	½	Garden City.	E	E	W—Prudden...	2-R	Ross.....	R	Savage....	120	N	34x3½	33x5	Sandow, CG
89	I	Torbensen.....	½	½	Rowland....	E	C	W—Schwarz..	2-R	Ross.....	P	Parish.....	140	N	34x3½	34x5	Schwartz B

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3,000 (Selden)—4,000 (Ogden) INTERNAL-COMBUSTION

Brand-name and model name or number.	Price f. o. b. factory with seat and tires but without body.	Horse-power rating by S. A. E. formula.	Bore and stroke of engine in inches.	Make of engine and model name or number.	Lubrication (Circulating, Splash).	Make of governor (N indicates None).	Water-circulation (Pump, Thermo-siphon).	Radiator (Cellular, Tubular) and make.	Ignition system (Dry Cells, Magneto, Storage battery) and make of magneto.	Make of carbureter.	Clutch (Cone, Multiple-disk, Plate) and make.	Transmission (Individual-clutch, Planetary, Sliding-gear) and number of forward speeds.	Make of transmission and model name or number.	Line number.
3,000 Pds.—Con.														
Selden, Special	$2,185	19.6	3¾x5	Continental, N.	C & S	Pierce	T	T—Bush	M—Bosch	Stromberg	M—Brown-Lipe	S-3	Brown-Lipe, 30.	1
Service, 31	2,785	25.6	4x5½	Buda, IU	C	Simplex	P	T—Long	M—Eisemann	Stromberg	P—Borg & Beck	S-4	Brown-Lipe, 50.	2
Service, 36	3,215	28.9	4½x5½	Buda, HU	C	Simplex	P	T—Long	M—Eisemann	Stromberg	P—Borg & Beck	S-4	Brown-Lipe, 50.	3
Signal, H	2,700	27.2	4½x5½	Continental, C4.	C & S	Pierce	P	T—McCord	M—Eisemann	Stromberg	M—Brown-Lipe	S-4	Brown-Lipe, 35.	4
Sterling	2,480	25.6	4 x5¾	Own	C	Waukesha	P	C—Own	M—Eisemann	Rayfield	M—Brown-Lipe	S-4	Brown-Lipe, 35.	5
Stewart, 9	1,975	22.5	3½x5	Continental, N.	C & S	N	T	T—Bush	M—Eisemann	Zenith	M—Fuller	S-3	Fuller, TU¾	6
Stoughton, B		22.5	3¾x5½		C		T	T—	M—Eisemann	Stromberg	M—	S-3	Brown-Lipe	7
Sullivan, F	2,350	22.5	3¾x4½	Buda, N	C	N	T	T—Bush	M—Bosch	Stromberg	C—Hartford	S-3	Covert, G1	8
Texan, TK	1,525	19.6	3½x5	Lycoming	S	N	T	C—Own	S—	Carter	P—Borg & Beck	S-3	Muncie	9
Tiffin, GW	2,300	27.2	4½x5½	Continental, C4.	C & S	Pierce	P	T—G & O	M—Bosch	Schebler	M—Fuller	S-3	Fuller	10
Transport, 30	1,950	22.5	3¾x5	Continental, N.	C & S	Simplex	T	C—	M—Eisemann	Stromberg	M—Fuller	S-3	Fuller	11
Triangle, A	2,185	22.5	3¾x5½	Waukesha, BUX.	S	Waukesha	P	T—Perfex	M—Eisemann	Stromberg	M—Fuller	S-3	Fuller, TU3	12
Ultimate, A		25.6	4 x5½		C		P	T—	M—		M—	S-4		13
United, A		22.5	3¾x4½	Buda, TU	S	Simplex	P	T—G & O	M—Bosch	Stromberg	M—Brown-Lipe	S-3	Brown-Lipe, 30.	14
Universal, G		22.5	3¾x5½	Buda		Monarch	P	T—Bremer	M—Eisemann	Zenith	P—Own	S-3	Own	15
U. S., N		22.5	3¾x5	Continental, N.	C & S	Monarch	P	T—Long	M—Eisemann	Stromberg	M—Brown-Lipe	S-3	Brown-Lipe, 30.	16
Velie, 46	1,925	22.5	3¾x5	Continental, N.	C & S	Monarch	P	T—Own	M—Bosch	Stromberg	P—Borg & Beck	S-3	Durston	17
Watson		22.5	3¾x5½	Waukesha, BUX	S	Waukesha	P	T—			M—Brown-Lipe	S-3	Brown-Lipe	18
White Hickory, H		22.5	3¾x5	Continental, N.	C & S	Simplex	P	T—Chicago	M—Eisemann	Stromberg	M—	S-3	Fuller	19
Wichita, L	2,350	19.6	3½x5	Own	C & S	N	T	C—Perfex	M—Eisemann	Stromberg	C—Own	S-4	Brown-Lipe	20
Wilcox		29.0	4½x5	Own	S	Pierce	P	T—Own	M—Bosch	Stromberg	C—Own	S-4	Own	21
Winther, 39	2,150	22.5	3¾x5	Wisconsin, CAU.	C	N	P	T—Bremer	M—Eisemann	Stromberg	M—Fuller	S-3	Fuller, TU¾	22
W'nth'r-M'w'n, 430	2,375	22.5	3¾x5	Wisconsin, CAU.	C		P	T—Bremer	M—Eisemann	Stromberg	M—Fuller	S-3	Fuller, TU¾	23
Wisconsin, B	1,750	19.6	3½x5½	Waukesha		Waukesha	P	T—Chicago	M—Eisemann	Master	M—Fuller	S-3	Fuller	24
Witt-Will, WD1½-19	2,100	22.5	3¾x4½	Continental	C & S	Pierce	P	C—Modine	M—Eisemann	Zenith	M—Brown-Lipe	S-3	Brown-Lipe	25
Wolverine, C	2,250	22.5	3¾x5	Continental, N.	C & S	Monarch	T	T—Long	M—Eisemann	Stromberg	M—Fuller	S-3	Fuller	26
3,000 Pounds:														
Oneida, B-9	2,385	22.4	4 x5	Own	C & S	Own	P	T—Modine	M—Bosch	Stromberg	M—Own	I-3	Own	27
4,000 Pounds:														
Acason, H		28.9	4½x5½	Buda, HU	C	Monarch	P	C—G & O	M—Eisemann	Schebler	M—Muncie	S-4	Muncie, T63	28
Acme, A	2,750	27.2	4½x5½	Continental, C4.	C & S	Duplex	P	T—G & O	M—Eisemann	Rayfield	P—Borg & Beck	I-3	Cotta, CU	29
Armleder, HW		27.2	4½x5¾	Continental, C4.	C & S	Monarch	T	T—Long	M—Bosch	Zenith	M—Brown-Lipe	S-3	Brown-Lipe	30
Atterbury, 7C	2,975	27.2	4½x5½	Continental, C4.	C & S	Monarch	P	T—Long	M—Eisemann	Zenith	M—Brown-Lipe	S-4	Brown-Lipe, 35.	31
Autocar, XXI-F	2,300	18.1	4¾x4½	Own	C & S	N	P	T—Own	M—Bosch	Stromberg	P—Own	S-3	Own	32
Available, 2	2,950	27.2	4½x5½	Continental, C4.	C & S		P	T—Chicago	M—Bosch	Stromberg	M—Brown-Lipe	S-4	Brown-Lipe	33
Beck, C	2,250	27.2	4½x5½	Continental, C4.	C & S	Pierce	P	C—Ideal	M—Bosch	Stromberg	M—Fuller	S-3	Fuller, 2-TU	34
Brockway, K3	2,950	27.2	4½x5½	Continental, C4.	C & S	N	P	T—	M—Eisemann	Schebler	C—Hartford	S-3	Brown-Lipe, 50.	35
Collier, 20	2,150	27.2	4½x5½	Continental	C & S	Monarch	P	T—Chicago	M—Eisemann	Zenith	M—Fuller	S-4	Fuller	36
Columbia, E	2,350	27.2	4½x5½	Continental, C4.	C & S	Pierce	P	T—Long	M—Dixie	Shakespe're	C—Hartford	S-3	Covert, G1	37
Conestoga	2,550	22.5	3¾x5	Continental	C & S		T	T—Eng. & M.	M—Bosch	Zenith	M—Fuller	S-3	Fuller, TU3	38
Corbitt, C	3,500	27.2	4½x5½	Continental		Duplex	P	T—Rome-T'r'y	M—Eisemann	Stromberg	M—Brown-Lipe	S-3	Brown-Lipe	39
Dart, CC4	2,950	28.9	4½x5½	Buda, HU	C	Simplex	P	C—Ideal	M—Eisemann	Zenith	M—Fuller	S-4	Fuller, GU	40
Day-Elder, D	2,450	27.2	4½x5½	Continental, C2.	C & S	Monarch	P	T—Bush	M—Berling	Zenith	M—Covert	S-3	Covert, RUNC.	41
Dearborn, BW	2,250	28.9	4¾x5½	Buda, WU	C & S	Pierce	P	T—Chicago	M—Bosch	Stromberg	P—Borg & Beck	S-3	Grant-Lees	42
Defiance, C	1,995	22.5	3¾x5	Continental, N.	C & S	Monarch	T	C—Perfex	M—Eisemann	Stromberg	P—Borg & Beck	S-3	Grant-Lees, 515.	43
DeKalb, E2	2,100	27.2	4½x5½	Continental, C4.	C & S	N	P	C—Jackson	M—Eisemann	Master	M—Fuller	S-3	Fuller, TU22	44
Denby, 134	2,450	22.5	3¾x5	Continental, N.	C & S	Monarch	T	T—Long	M—Eisemann	Stromberg	M—Fuller	S-4	Fuller, GU	45
Diamond T, J3	3,185	27.2	4½x5½	Continental, C4.	C & S	Pierce	P	T—G & O	M—Bosch	Stromberg	M—Brown-Lipe	S-3	Brown-Lipe, 35.	46
Dorris, K4	3,285	28.9	4½x5½	Own, K4	C	Own	P	T—McCord	M—Bosch	Stromberg	M—Warner	S-4	Warner, T53	47
Fargo, P	2,200	22.5	3¾x5	Continental, N.	C & S	Monarch	T	T—Own	M—Bosch	Rayfield	C—Mechanics	S-3	Fuller	48
Federal, U	2,600	27.2	4½x5½	Continental, C4.	C & S	Monarch	P	T or C—Own	M—Eisemann	Zenith	P—Borg & Beck	S-4	Own	49
Forschler	2,750	27.2	4½x5½	Continental, C4.	C & S	Pierce			M—Bosch	Zenith	M—Fuller	S-3	Fuller	50
Fulton, C	2,350	18.2	3¾x5	Herschell-Spill'n.			T	T—G & O	M—Simms	Carter	P—Borg & Beck	S-3	Durston	51
Gabriel, E	3,250	35.0	4½x5½	Buda, HTU	C	Duplex	P	T—G & O	M—Bosch	Rayfield	P—Borg & Beck	S-4	Brown-Lipe, 50.	52
Garford, 70B	2,990	29.0	4½x5½	Buda, TU	C & S	Simplex	P	T—Own	M—Splitdorf	Rayfield	M—Brown-Lipe	S-4	Own	53
Gary, H		28.9	4½x5½	Buda, HU	C	Simplex	P	T—Chicago	M—Eisemann	Master	M—Fuller	S-3	Fuller, TU3	54
Giant, 16	2,850	27.2	4½x5½	Continental, C4.	C & S	N	P	C—Own	M—Eisemann	Schebler	M—Warner	S-3	Warner, 57	55
GMC, 41	2,950	27.2	4½x5½	Continental, C2.	C & S	Monarch	P	T—Own	M—Eisemann	Marvel	M—Own	S-4	Own	56
Gramm-Bern't'n, 20	2,900	27.2	4½x5½	Continental, C2.	C & S	Pierce	P	T—Own	S—North East.	Stromberg	M—Fuller	I-3	Own	57
Grant, 15	2,150	22.5	3¾x5	Continental, N.	C & S	Pierce	T	T—Fedders	M—Splitdorf	Carter	P—Borg & Beck	S-3	Grant-Lees, 515.	58
Grant, 16	2,250	22.5	3¾x5	Continental, N.	C & S	Pierce	T	T—Fedders	M—Splitdorf	Carter	P—Borg & Beck	S-3	Grant-Lees, 515.	59
Hall	2,875	27.2	4½x5½	Continental, C4.	C & S	Duplex	P	T—Long	M—Eisemann	Zenith	M—Brown-Lipe	S-3	Brown-Lipe	60
Harvey, WBA	2,350	27.2	4½x5½	Buda, OU	S	Monarch	P	T—Chicago	M—Bosch	Zenith	M—Fuller	S-3	Fuller, TU3	61
Hawkeye, L	2,650	22.5	3½x5½	Buda		Simplex	P	C—Ideal	M—Eisemann	Zenith	M—Fuller	S-4	Fuller	62
Hendrickson	3,000	29.0	4½x5½	Buda, BU4R	S		P	T—Chicago	M—Dixie	Stromberg	M—Fuller	S-4	Fuller	63
Hurlburt, 2	3,500	29.0	4½x5½	Buda, HU	C	Duplex	P	T—G & O	M—Eisemann	Flechter	M—Brown-Lipe	S-3	Brown-Lipe, 35.	64
Independent (Iowa)	2,290	27.2	4½x5½	Continental, C4.	C & S		T	T—Chicago	M—Bosch	Stromberg	M—Fuller	S-3	Fuller	65
Indep'nd't G. (Ohio)	2,300	27.2	4½x5½	Continental, C4.	C & S	Monarch	P	T—Chicago	M—Eisemann	Zenith	M—Fuller	S-3	Fuller, TU3	66
Indiana, D	2,800	27.2	4½x5½	Rutenber, 38	C	Pierce	P	P—Long	M—Eisemann	Stromberg	P—Borg & Beck	S-4	Brown-Lipe, 50.	67
International, G	2,600	25.6	4 x5	Own	C & S	Own	T	T—Own	M—Dixie	Ensign	M—Own	S-3	Own	68
Kimball, 4A		25.6	4 x6	Wisconsin		Simplex	P	C—Flexo	M—Eisemann	Master	M—Brown-Lipe	S-4	Brown-Lipe	69
King-Zeitler	2,950	27.2	4½x5½	Continental, C4.	C & S	Pierce	P	T—Chicago	M—Bosch	Stromberg	M—Brown-Lipe	S-4	Brown-Lipe, 50.	70
Kissel Freighter	2,833	29.0	4½x5½	Own, 4-36	C & S	Pierce	P	T—McCord	M—Eisemann	Stromberg	M—Warner	S-4	Warner, T 53	71
Kleiber, BB	2,950	27.2	4½x5½	Continental, C4.	C & S	Pierce	P	C—Perfex	M—Bosch	Stromberg	M—Hele-Shaw	S-3	Brown-Lipe	72
Lange, B	2,950	27.2	4½x5½	Continental, C4.	C & S	Pierce	T		M—Bosch	Stromberg	M—Hele-Shaw	I-3	Own	73
Mack, AB (chain)	3,300	25.6	4 x5	Own	C & S	Own	P	C—El Arco	M—Splitdorf	Zenith	M—Brown-Lipe	S-4	Brown-Lipe	74
Mack, AB (worm)	3,300	25.6	4 x5	Own	C & S	Own	P	C—El Arco	M—Splitdorf	Zenith	M—Brown-Lipe	S-4	Brown-Lipe	75
Manly, 40	2,350	22.5	3¾x5½	Waukesha, BUX.	S	Waukesha			M—Eisemann	Zenith		S-3		76
Master, M	2,590	29.0	4½x5½	Buda, HU	S	McCanna	P	T—Chicago	M—Eisemann	Master	M—Fuller	S-4	Fuller	77
Master, W	2,890	29.0	4½x5½	Buda, HU	C	McCanna	P	T—Chicago	M—Eisemann	Master	M—Fuller	S-4	Fuller	78
Menominee, D		27.2	4½x5½	Continental, C4.	C & S	Monarch	P	T—G & O	M—Eisemann	Stromberg	M—Fuller	S-	Fuller, TU2	79
Midland, MT	3,000	38.9	4½x5½	Buda, HU	C	Duplex	P	T—Chicago	M—Eisemann	Stromberg	P—Borg & Beck	S-4	Brown-Lipe, 50-4	80
Muskegon, 20	2,325	27.2	4½x5½	Continental, C4.	S	Pierce	P	C—Mayo	M—Eisemann	Stewart	M—Fuller	S-3	Fuller, TU3	81
Mutual		25.6	4 x6	Wisconsin		Duplex		C—Perfex	M—Bosch	Stromberg	M—Hele-Shaw	S-4	Fuller, GS	82
Nash, 3018	2,250	22.5	3¾x5½	Own	C	Duplex	P	T—Long	M—Eisemann	Stromberg	P—Borg & Beck	S-3	Detroit, C	83
Nash, 4017	3,250	28.0	4½x5½	Buda, HU	C	Duplex	P	T—McCord	M—Eisemann	Stromberg	P—Borg & Beck	I-4	Own	84
Nelson & LeM'n, F2	2,775	27.2	4½x5½	Continental, C4.	C & S	Pierce	P	T—Chicago	M—Bosch	Stromberg	M—Brown-Lipe	S-3	Brown-Lipe, 50.	85
Netco, D	3,200	27.2	4½x5½	Continental, C4.	C & S		P	T—Rome-T'r'y	M—Eisemann	Zenith	M—Brown-Lipe	S-3	Brown-Lipe	86
Niles, E	2,400	27.2	4½x5½	Continental, C4.	C & S	Pierce			M—Eisemann	Stromberg	P—Borg & Beck	S-3	Covert	87
Noble, C40		25.6	4 x5½	Buda, ITU		Pierce	P	T—	M—Eisemann	Stromberg	M—Fuller	S-3	Fuller, LTU5	88
Nor hway, B-2		25.6	4 x6			Pierce		C—	M—		M—	S-4		89
Ogden, B1		27.2	4½x5½	Continental, C2.	C & S	Pierce		T—Chicago	M—Bosch	Ruyfield	M—Brown-Lipe	S-4	Brown-Lipe	90

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TRUCK SPECIFICATIONS

3,000 (Selden)—4,000 (Ogden)

Line number.	Final drive (Bevel-gear, Chain, External-gear, Internal-gear, Spur-and-bevel, Worm-gear).	Make of rear axle and model name or number.	Front springs (½, 1, or Full elliptic; Tranverse).	Rear springs (Cantilever; ½, 1, or Full elliptic; Transverse.	Make of springs.	Service brake (Contracting, Expanding).	Emergency brake (Contracting, Expanding).	Wheels (Iron, Steel, Wood) and make.	Number and location of driving-wheels (All-around, Front, Rear).	Make of steering-gear.	Frame material Pressed-steel, Rolled-steel, Wood)	Make of frame.	Wheel-base in inches.	Is self-starter furnished? (Yes or No.)	Front tire size in inches (Dual, Pneumatic)	Rear tire size in inches (Dual, Pneumatic)	Brand-name and model name or number.
																	3,000 Pds.—Con.
1	W	Timken, 6456	½	½	Perfection	E	E	W—Wayne	2-R	Lavine	P	Parish & B.	140	N	34x3½	34x5	Selden, Speeial
2	W	Timken, 6552	½	½		E	E	W—Bimel	2-R	Ross	P	Own	150	N	36x3½	36x6	Service, 31
3	W	Timken, 6552	½	½		E	E	W—Bimel	2-R	Ross	P	Own	150	N	35x5p	38x7p	Service, 36
4	W	Timken, 6552	½	½	Perfection	E	E	W—Hayes	2-R	Ross	P	Savage	146	N	34x4	36x6	Signal, H
5	W	Timken, 6460		½	Mather	E	E	W—Prudden	2-R	Ross	PW	Own	142	N	36x3½	36x5	Sterling
6	I	Clark, 1D	½	½		C	C	W—Wayne	2-R	Gemmer	P		140	N	34x3½	34x5	Stewart, 9
7	W	Sheldon	½	½		E	E	W—	2-R		P	Smith	140½	N	36x3½	36x5	Stoughton, B
8	W	Timken, 6552	½	½	Merrill	E	E	W—Wayne	2-R	Ross	R	Own	129	N			Sullivan, F
9	W	Chicago	½	½	Maremont	E	E	W—	2-R	C. A. S.	P	Parish & B.	144	Y	34x4p	34x5	Texan, TK
10	W	Sheldon			Kalamazoo	E	E	W—Bimel	2-R	Ross	P	Parish & B.	135	N	36x3½	36x5	Tiffin, GW
11	I	Clark	½	½	Detroit				2-R	Jacox			140	N	36x3½	36x5	Transport, 30
12	I	Clark, 1	½	½	Detroit	C	C	W—Hayes	2-R	Gemmer	R	Mason	144	N	34x3½	34x6	Triangle, A
13	W		½	½		E	E	W—	2-R		P		140	N	36x3	36x5	Ultimate, A
14	I	Clark, 1D	½	½	Detroit	E	E	W—	2-R	Jacox	P	Detroit	145	N	34x3½	34x5	United, A
15	W	Own			Kalamazoo	E	E	W—	2-R	Lavine	P		133	N	34x3½	34x5	Universal, G
16	I		½	½		C	C	W—Schwarz	2-R	Lavine	P	Own	144	N	36x3½	36x5	U. S., N
17	I	Torbensen	½	½	Mather	E	E	W—Bimel	2-R	Ross	P	Dunbar	133	N	36x3½	36x5	Velie, 46
18	W					E	E		2-R		P			N	36x3½	36x6	Watson
19	W	Timken	½	½		E	E	W—	2-R		P		144	N	36x3½	36x5	White Hickory, H
20	W	Sheldon	½	½	Detroit	E	E	W—Bimel	2-R	Ross	P	Own	144	N	36x3½	36x5	Wichita, L
21	W	Wisconsin, 800H	½	½	Sheldon	E	E	I—Smith	2-R	Own	P	Own	144	N	36x4	36x5	Wilcox
22	I	Clark, 1D	½	½	Harvey	E	E	S—Own	2-R	Lavine	P	Own	140	N	32x3½	32x5	Winther, 39
23	I	Clark, 1D	½	½	Harvey	C	E	S—Own	4-A	Lavine	R	Own	132	N	32x4	32x4	W'nth'r-M'w'n,430
24	W	Sheldon				E	E	W—	2-R	Lavine	P	Smith	136	N	34x3½	34x4	Wisconsin, B
25	W	Timken	½	½	Delaney	E	E	W—Archibald	2-R	Ross	P	Parish	144	N	36x3½	36x5	Witt-Will,WD1½-1
26	I	Russel			Tuthill	C	E	W—	2-R	Gemmer	P	Parish & B.	140	N	34x3½	34x5	Wolverine, C
																	3,500 Pounds:
27	W	Own	½	½	Mather	E	E	W—	2-R	Ross	P	Own	135	N	36x3½	36x5	Oneida, B-9
																	4,000 Pounds:
28	W	Timken, 6552	½	½	Detroit	E	E	W—Hayes	2-R	Ross	P	Savage	172	N	36x4	36x7	Acason, H
29	W	Timken, 6552	½	½	Detroit	E	E	W—Hayes	2-R	Ross	P	Smith	148	N	36x4	36x7	Acme, A
30	W	Timken	½	½	Mather	E	E	W—St. Mary's	2-R	Ross	P	Smith	166	N	36x4	36x4	Armleder, HW
31	W	Timken, 6552	½	½	Spring Perch	E	E	W—Bimel	2-R	Gemmer	P	Savage	153½	N	36x4	36x4d	Atterbury, 7C
32	S	Own	½	½T		C	E	W—	2-R		P	Own	97	N	34x4	34x5	Autocar, XXI-F
33	W	Wisconsin, 800J	½	½	Tuthill	E	E	W—Schwarz	2-R	Lavine	R	Own	148	N	36x4	36x7	Available, 2
34	I	Clark, 2	½	½	Higgins	C	E	W—Bimel	2-R	Lavine	P	Parish & B.	144	N	36x3½	36x6	Beck, C
35	W	Timken, 6552	½	½	Merrill	E	E	W—Hoopes	2-R	Gemmer	P	Parish	148	N	36x4	36x7	Brockway, K3
36	W		½	½		E	E	W—	2-R	Ross			152	N	36x4	36x7	Collier, 20
37	I	Russel, U	½	½	Perfection	C	E	W—Hayes	2-R	Own	R	Own	144	N	36x4	36x6	Columbia, B
38	W	Wisconsin, 800J	½	½		E	E	W—	2-R	Ross	P		136	N	36x4	36x4d	Conestoga
39	W	Sheldon	½	½	Sheldon	E	E	W—Bimel	2-R	Ross	P		148	N	36x4	36x7	Corbitt, C
40	W	Timken, 6552	½	½	Perfection	E	E	W—Prudden	2-R	Ross	P	Savage	150	N	36x4	36x7	Dart, CC4
41	W	Wisconsin, 800J	½	½	Iron City	E	E	W—Jones	2-R	Ross	P	Savage	144	N	36x4	36x6	Day-Elder, D
42	W	Standard, D	½	½	Cleveland	E	E	W—Prudden	2-R		P	Dearborn	144	N	32x4p	34x5	Dearborn, BW
43	I	Torbensen, A	½	½	Standard	C	E	W—Bimel	2-R	Ditwiler	P	Detroit	135	N	34x3½	34x6	Defiance, C
44	W	Timken, 6552	½	½	Kalamazoo	E	E	W—Hayes	2-R	Ross	P	Parish	144	N	36x3½	36x5	DeKalb, E2
45	I	Russel, S-200	½	½	Detroit	C	E	W—Hayes	2-R	Gemmer	P	Detroit	144	N	36x3½	36x6	Denby, 134
46	W	Timken, 6560	½	½	Mather	E	E	W—Prudden	2-R	Gemmer	P	Smith	154	N	36x4	36x7	Diamond T, J3
47	W	Timken, 6552	½	½	Rowland	E	E	W—Hayes	2-R	Ross	P	Smith	144	N	36x4	36x7	Dorris, K4
48	I	Russel			Sheldon	C	E	W—	2-R	Jacox	R	Own	144	N	36x4	36x6	Fargo, P
49	W	Timken, 6552	½	½	Mather	E	E	W—	2-R	Gemmer	P		156	N	36x4	36x7	Federal, U
50	W	Sheldon			Delaney	E	E		2-R	Ross			140	N	34x4	34x6	Forschler
51	I	Russel	½	½	Perfection	C	E	W—	2-R	Lavine	P	Parish & B.	137	N	34x4	34x6	Fulton, C
52	W	Timken, 6552	½	½	Merrill	E	E	W—Standard	2-R	Gemmer	P	Parish	156	N	36x5p	36x7	Gabriel, E
53	W	Timken, 6552	½	½	Perfection	E	E	W—	2-R	Ross	P	Own	144	N	36x4	36x7	Garford, 70B
54	W	Sheldon, W-21	½	½	Tuthill	E	E	W—Hayes	2-R	Ross	P	Parish & B.	156	N	36x4	36x6	Gary, H
55	W	Timken, 6552	½	½	Mather	E	E	W—Prudden	2-R	Jacox	R	Hydraulic	144	N	36x4	36x7	Giant, 16
56	W	Timken, 6360	½	½	Detroit	E	E	S—Own	2-R	Jacox	P	Parish	144	N	36x4	36x7	GMC, 41
57	W	Sheldon	½	½		E	E	W—Bimel	2-R	Ross	P		144	N	36x4	36x7	Gramm-Bern't'n,20
58	I	Torbensen, C	½	½	Perfection	C	E	W—Bimel	2-R	Jacox	P	Savage	124	Y	34x4	34x6	Grant, 15
59	I	Torbensen, C	½	½	Perfection	C	E	W—Bimel	2-R	Jacox	P	Savage	140	Y	34x4	34x6	Grant, 16
60	W	Timken	½	½	Detroit	C	E	I—Smith	2-R	Gemmer	R	Own		N	36x4	36x4	Hall
61	W	Sheldon	½	½	Maremont	E	E	I—Smith	2-R	Ross	P	Parish	128	N	34x3½	34x5	Harvey, WBA
62	I	Clark			Detroit			W—Bimel	2-R	Gemmer	R	Own	148	N	34x4	34x6	Hawkeye, L
63	W	Timken			Tuthill			W—	2-R	Ross			140	N	36x4	37x7	Hendrickson
64	W	Own	½	½	Merrill	C	E	W—Wayne	2-R	Ross	P	Parish	148	N	36x4	36x4d	Hurlburt, 2
65	I	Torbensen	½	½		C	E	W—	2-R	Lavine	P		146	N	34x4	34x6	Independent(Iowa)
66	W	Wisconsin, 800J	½	½		E	E	W—Bimel	2-R	Wohlrab	P		144	N	34x3½	34x6	Indepe'd't,G(Ohio)
67	W	Sheldon, W21	½	½		E	E	W—Bimel	2-R	Wohlrab	R	Own	150	N	36x4	36x7	Indiana, D
68	I	Own	½	½		E	E	W—	2-R	Ross	P	Savage	138	N	36x4	36x6	International, G
69	W	Sheldon						S—	2-R	Lavine	P		154	N	36x4	36x6	Kimball, 4A
70	W	Timken, 6560	½	½	Tuthill	E	E	W—St. Mary's	2-R	Lavine	R	Own	150	N	36x4	36x8	King-Zeitler
71	W	Timken, 2752	½	½	Mather	E	E	W—Prudden	2-R	Lavine	P	Smith	168	N	34x4	36x7	Kissel, Freighter
72	W	Timken			Betts	E	E	W—	2-R	Ross	R	Own	140	N	36x4	36x3½d	Kleiber, BB
73	C	Own			Standard	E	E	W—	2-R	Gemmer	R	Own	126	N	36x4	36x6	Lange, B
74	C	Own	½	½	Merrill	C	E	W—Schwarz	2-R	Gemmer	P	Own	Opt'nal	N	36x4	36x4d	Mack, AB (chain)
75	W	Timken or Sheldon	½	½	Merrill	C	E	W—Schwarz	2-R	Gemmer	P	Own	Opt'nal	N	36x4	36x4d	Mack, AB (worm)
76	W	Wisconsin, 800J				C	E	W—	2-R	Wohlrab			156	N	36x4	36x6	Manly, 40
77	I	Torbensen	½	½	Detroit	C	E	W—Prudden	2-R	Ross	P	Parish & B.	144	N	34x4	36x7	Master, M
78	W	Timken	½	½	Detroit	E	E	W—Prudden	2-R	Ross	P	Parish & B.	144	N	34x4	36x7	Master, W
79	W	Timken, 6552	½	½	Tuthill	E	E	W—Standard	2-R	Ross	R	Own	144	N	36x4	36x4d	Memominee, D
80	I	Timken, 6552	½	½	Sheldon	C	E	I—Smith	2-R	Ross	P	Parish & B	150	N	36x4	36x7	Midland, MT
81	I	Torbensen, CT2	½	½	Perfection	C	E	W—Prudden	2-R	Lavine	P	Parish & B.	144	N	36x4	36x6	Muskegon,20
82	W	Sheldon	½	½	Mather			I—Smith	2-R	Ross	P	Parish & B.	150	Y	36x4	36x8	Mutual
83	W	Clark, 2	½	½	Alloy Steel	C	C	W—Auto&Bim	2-R	Jacox	P	Smith	144	Y	34x4	34x6	Nash, 3018
84	I	Own	½	½	Mather	E	E	S—	4-A	Lavine	P	Smith	124	Y	36x5	36x5	Nash, 4017
85	W	Timken, 6552	½	½	Tuthill	E	E	W—Prudden	2-R	Lavine	R	Own		N	36x4	36x7	Nelson&LeM'n, F2
86	W	Timken			Perfection	E	E	W—	2-R	Ross	P	Parish & B.	144	N	36x4	36x6	Netco, D
87	W	Timken				E	E		2-R	Gemmer			140	N	36x4	36x7	Niles, E
88	W	Sheldon, W103	½	½	Tuthill	E	E	W—Bimel	2-R	Lavine	P	Parish & B.	148	N	36x4	36x7	Noble, C40
89	W		½	½		E	E	W—	2-R	Ross	P		146	Y	36x5	36x7d	Northway, B-2
90	W	Timken	½	½		E	E	W—	2-R	Gemme	P		160	N	36x4	36x7	Ogden, B-1

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4,000 (O. K.)—5,000 (Sanford) INTERNAL-COMBUSTION

Brand-name and model name or number.	Price f. o. b. factory with seat and tires but without body.	Horse-power rating by S. A. E. formula.	Bore and stroke of engine in inches.	Make of engine and model name or number.	Lubrication (Circulating, Splash).	Make of governor (N indicates None).	Water-circulation (Pump, Thermo-siphon).	Radiator (Cellular, Tubular) and make.	Ignition system (Dry Cells, Magneto, Storage battery) and make of magneto.	Make of carbureter.	Clutch (Cone, Multiple-disk, Plate) and make.	Transmission (Individual-clutch, Planetary, Sliding-gear) and number of forward speeds.	Make of transmission and model name or number.	Line number.
4,000 Pds.—Con.														
O. K., 2T	$2,850	27.2	4½x5½	Buda, OU	C & S	Pierce	P	T—Chicago	M—Eisemann	Zenith	M—Fuller	S-3	Fuller, TU3	1
Oshkosh, A	3,500	16.9	3¼x5	Herschell-S, 2700	S	Duplex	T	C—Own	S—	Zenith	M—Brown-Lipe	S-4	Brown-Lipe, 35	2
Oshkosh, AA	3,600	19.6	3½x5	Herschell-S, 2700	S	Duplex	T	C—Own	S—	Zenith	M—Brown-Lipe	S-4	Brown-Lipe, 35	3
Packard, 2E	3,600	25.6	x5½	Own	C	Own	P	T—	M—Dixie	Own	M—Own	S-4	Own	4
Palmer	2,277	27.2	4½x5¼	Continental, C4	C & S	Pierce	P	C—Fedders	M—Bosch	Stromberg	M—Fuller	S-3	Fuller	5
Parker, F9W	3,500	25.6	4 x6	Wisconsin, TAU	C & S	Monarch	P	T—Bremer	M—Bosch	Stromberg	M—Brown-Lipe	S-4	Fuller	6
Parker, F9C	3,325	29.4	3½x5¼	Wisc. (6 cyl.)	C & S	Monarch	P	T—Bremer	M—Bosch	Stromberg	M—Brown-Lipe	S-4	Fuller, G	7
Pierce-Arrow, X4	4,300	25.6	4 x5½	Own, X4	C	Own	P	T—Own	M—	Own	C—Own	S-4	Own, X4	8
Power, B	2,950	27.2	4½x5¼	Continental, C2	C & S	Pierce	P	C—Candler	M—Simms	Stromberg	M—Fuller	S-4	Fuller, GU	9
Rainier, R8	2,400	22.5	3¾x5	Continental, N	C & S	Monarch	T	C—Harrison	M—Simms	Zenith	M—Brown-Lipe	S-3	Brown-Lipe	10
Rowe, CDW	3,000	25.6	4 x5	Wisconsin, EU	C	Simplex	P	C—Mayo	M—Bosch	Zenith	M—Brown-Lipe	S-4	Brown-Lipe, 50	11
Royal	3,200	25.6	4 x6	Wisconsin		Monarch	P	T—Kells	M—Bosch	Stromberg	P—Borg & Beck	I-3	Own	12
Sandow, I	2,375	22.5	3¾x5	Continental, N	C & S	N	P	T—Chicago	M—Eisemann	Stromberg	M—Fuller	S-3	Fuller, LTU	13
Schacht	3,350	28.9	4¼x5½	Buda, HU	C	Duplex	P	T—Bremer	M—Bosch	Schebler	C—Hartford	S-3	Own, C	14
Selden, JWB		27.2	4½x5¼	Continental, C4	C & S	Pierce	P	T—Bush	M—Bosch	Stromberg	M—Brown-Lipe	S-4	Brown-Lipe, 35	15
Selden, JCB		27.2	4½x5¼	Continental, C4	C & S	Pierce	P	T—Bush	M—Bosch	Stromberg	M—Brown-Lipe	S-4	Brown-Lipe, 35	16
Shaw, M3	2,700	27.2	4½x5¼	Continental, C4	C & S	Pierce	P	T—Long	M—Bosch	Zenith	M—Brown-Lipe	S-3	Brown-Lipe	17
Signal, J	3,100	27.2	4½x5¼	Continental, C4	C & S	Pierce	P	T—McCord	M—Eisemann	Stromberg	M—Brown-Lipe	S-4	Brown-Lipe, 50	18
Signal, JL	3,175	27.2	4½x5¼	Continental, C4	C & S	Pierce	P	T—McCord	M—Eisemann	Stromberg	M—Brown-Lipe	S-4	Brown-Lipe, 50	19
Standard, 76	2,800	27.2	4½x5¼	Continental, C2	C & S	Pierce	P	T—Long	M—Eisemann	Schebler	M—Brown-Lipe	S-4	Brown-Lipe, 35	20
Steele, C	2,500	27.2	4½x5¼	Continental, C4	C & S	Own	P	C—Bush	M—Eisemann	Stromberg	M—Hele-Shaw	-3	Cotta	21
Stewart, 7	2,575	27.2	4½x5½	Continental, C2	C & S	Pierce	P	T—Bush	M—Eisemann	Zenith	M—Fuller	S-3	Fuller, TU3	22
Stoughton, D		25.6	4 x5½		C		P	T—Chicago	M—Eisemann	Stromberg	M—	S-3	Brown-Lipe	23
Sullivan, E	2,850	27.0	4½x5½	Buda, OU	S	N	P	P—Bush	M—Bosch	Stromberg	M—Brown-Lipe	S-3	Brown-Lipe, 35	24
Superior, E	2,450	27.2	4½x5¼	Continental, C2	C & S	Pierce	P	C—Ideal	M—Eisemann	Stromberg	M—Fuller	S-3	Fuller, TU3	25
Tower, F	2,975	27.2	4½x5¼	Continental, C4	C & S	Pierce	P	T—Own	M—Bosch	Stromberg	M—Fuller	S-3	Fuller, TU3	26
Traffic, C	1,395	22.5	3¾x5	Continental, N	C & S	N	P	C—Own	M—Bosch	Carter	M—Covert	S-3	Covert, BT	27
Triangle, B	2,850	27.3	4½x5½	Rutenber, 38	C & S	Pierce	P	T—Perfex	M—Eisemann	Stromberg	M—Fuller	S-4	Fuller, GU	28
Universal, D		28.9	4¼x5½	Own		Monarch	P	T—Long	M—Eisemann	Zenith	M—Own	S-3	Own	29
Velie, 25B	2,950	27.2	4½x5¼	Continental, C4	C & S	Pierce	P	T—Own	M—Bosch	Stromberg	M—Brown-Lipe	S-4	Brown-Lipe, 50	30
Vim, 22	3,150	22.5	3¾x5½	Hercules	C	Duplex	P	T—McCord	M—Dixie	Zenith	M—Brown-Lipe	S-4	Brown-Lipe, 35	31
White, 20	3,300	22.5	3¾x5½	Own	C & S	N	P	C—	M—	Own	P—Own	S-4	Own	32
Wichita, M	2,750	22.5	3¾x5¼	Waukesha, BX	C & S	Waukesha	P	C—Perfex	M—Eisemann	Stromberg	C—Own	S-4	Brown-Lipe	33
Wilson, R	2,800	27.2	4½x5¼	Continental, C4	C & S	Pierce	P	T—Own	M—Eisemann	Marvel	C—Hartford	S-	Covert, G-I	34
Winther, 49	3,000	25.6	4 x5	Wisconsin, EAU	C	N	P	T—Bremer	M—Eisemann	Master	P—Borg & Beck	S-4	Brown-Lipe, 50	35
4,500 Pounds:														
Oneida, C-9	2,900	25.6	4 x5	Own	C & S	Own	P	—Modine	M—Bosch	Stromberg	M—Own	I-4	Own	36
White Hickory, H	2,400	22.5	3¾x5	Continental, N	C & S	Pierce	P	C—Chicago	M—Eisemann	Stromberg	M—Fuller	S-3	Fuller, TU3	37
5,000 Pounds:														
Ace	3,500	28.9	4¼x5½	Buda, HU	C	Pierce		C—Modine	S—Atwater-K	Schebler	M—Brown-Lipe	S-4	Brown-Lipe	38
Apex, E		33.7	4¼x5½	Buda, HU	C	Simplex		C—	M—Eisemann	Stromberg	M—Fuller	S-3	Fuller, TU3	39
Available, 2½	3,250	32.4	4½x5½	Continental, E4	C & S	Pierce	P	T—Chicago	M—Bosch	Stromberg	M—Brown-Lipe	S-4	Brown-Lipe, 35	40
Beck, D	2,650	32.4	4½x5½	Continental, E4	C & S	Pierce	P	C—Ideal	M—Bosch	Stromberg	M—Fuller	S-3	Fuller, 2-TU	41
Bell		28.9	4¼x5½	Buda, HU	C	Duplex	P	T—Chicago	M—Eisemann	Stromberg	P—Borg & Beck	S-3		42
Bessemer, J2	2,785	27.2	4½x5½	Continental, C2	C & S	Pierce	P	C—Ideal	M—Bosch	Rayfield	P—Borg & Beck	S-4	Brown-Lipe, 50	43
Bethlehem, E	2,365	25.6	4 x4½	Own	C & S	Monarch	T	C—Fedders	S—	Shebler	P—Borg & Beck	S-3	Detroit, CX	44
Brinton, F	3,000	27.2	4½x5¼	Continental, C4	C & S	Pierce	P	T—	M—Bosch		M—	S-3		45
Chicago, C-2½	3,000	27.2	4½x 5¼	Continental, C2	C & S	Pierce	P	T—	M—Bosch	Zenith	M—Brown-Lipe	S-4	Brown-Lipe	46
Clydesdale, 65X		27.2	4½x5¼	Continental, C4	C & S	Own	P	T—Own	M—Bosch	Zenith	M—Brown-Lipe	S-4	Brown-Lipe, 50	47
Concord, B	2,850	28.9	4¼x5½	Buda		Monarch		T—Bush	M—Eisemann	Zenith	M—Brown-Lipe	S-3	Brown-Lipe	48
Corbitt, B	3,500	27.2	4½x5¼	Continental, C4	C & S	Duplex	P	T—Rome-T'r'y	M—Eisemann	Stromberg	M—Brown-Lipe	S-4	Brown-Lipe	49
Day-Elder, C	2,750	29.0	4½x5½	Buda, TU	C & S	Monarch	P	T—Bush	M—Berling	Zenith	M—Covert	S-3	Covert, RU3C	50
Dearborn, H		28.9	4½x5½	Buda, HU	C	Pierce	P	T—Chicago	M—Eisemann	Stromberg	P—Borg & Beck	S-3	Cotta	51
DeKalb, E2½	2,600	27.2	4½x5¼	Continental, C4	C & S	N	P	C—Jackson	M—Eisemann	Master	M—Fuller	S-3	Fuller TU22	52
Denby, 25	3,250	27.2	4½x5¼	Continental, C2	C & S	Monarch	T	T—Long	M—Eisemann	Stromberg	M—Fuller	S-4	Fuller, GU	53
Dependable		28.9	4½x5½	Buda	C		P	T—	M—Dixie	Stromberg	M—	S-4		54
Doane	3,750	28.9	4¼x5¾		C & S		P		M—Bosch		M—	S-3	Brown-Lipe	55
Douglas, E	2,625	28.9	4¼x5½	Buda, HU	C & S	Pierce	P	T—Chicago	M—Eisemann	Schebler	M—Fuller	S-4	Fuller, GU	56
Fageol	3,400	28.9	4¼x5¼	Waukesha, BU4R	S	Waukesha			M—Dixie	Zenith	P—	S-3	Brown-Lipe	57
Gary, HU		28.9	4¼x5½	Buda, HU	C	Simplex	P	T—Chicago	M—Eisemann	Master	M—Fuller	S-4	Fuller, GU	58
Gersix, G	3,150	19.6	3½x5½	Buda, LSU	S	Monarch	P	C—Ideal	M—Bosch	Stromberg	P—Borg & Beck	S-3	Cotta, BUA	59
Gersix, K	3,150	28.9	4¼x5½	Buda, HU	C	Monarch	P	C—Ideal	M—Bosch	Stromberg	P—Borg & Beck	I-3	Cotta, BUA	60
Gramm-Bern'n, 25	3,650	28.9	4¼x5¼	Waukesha, R	C & S	Waukesha	P	T—Own	M—Eisemann	Zenith	M—Own	I-3	Own	61
Hahn, E	2,500	32.4	4½x5½	Continental, E4	C & S	Pierce	P	T—Chicago	M—Bosch	Stromberg	M—Brown-Lipe	S-3	Brown-Lipe	62
Harvey, WFA	3,000	29.0	4¼x5½	Buda	C	Duplex	P	T—Chicago	M—Eisemann	Stromberg	P—Borg & Beck	S-4	Brown-Lipe	63
Jumbo, D	2,700	28.9	4¼x5½	Buda, HU	C	Duplex	P	C—G & O	M—Eisemann	Zenith	M—Fuller	S-3	Fuller, TU3	64
Kalamazoo, H	3,150	28.9	4¼x5½	Buda, HTU	C	Pierce	P	C—Hooven	M—Bosch	Stromberg	M—Fuller	S-4	Fuller, G	65
Kankakee, E	2,465	29.4	3½x5¼	Continental, 9N	C & S	N	P	C—Auto	S—Delco	Zenith	M—Muncie	S-3	M'c'e,As-5T-23N	66
Kelly-Sp'gf'd, K-35	3,500	22.5	3¾x5¼	Own, K30	C	Own	P	C—Own	M—Eisemann	Zenith	C—Own	S-3	Covert O	67
Kelly-Sp'gf'd, K-36	3,500	22.5	3¾x5¼	Own, K30	C	Own	P	C—Own	M—Eisemann	Zenith	C—Own	S-3	Covert, O	68
Kimball, 6A		28.9	4¼x6	Wisconsin		Simplex	P	C—Flexo	M—Eisemann	Master	M—Brown-Lipe	S-4	Brown-Lipe	69
Kleiber, B	3,500	32.4	4½x5½	Continental, E4	C & S	Pierce	P	C—Pertex	M—Bosch	Stromberg	M—Hele-Shaw	S-4	Brown-Lipe	70
Koehler, M	2,965	25.6	4 x5½	Hercules, CU3		Simplex	P	T—Long	M—Eisemann	Zenith	M—Brown-Lipe	S-4	Brown-Lipe	71
Larrabee, C	3,000	27.2	4½x5¼	Continental, C4	C & S	Pierce	P	T—Bush	M—Bosch	Stromberg	M—Brown-Lipe	S-4	Brown-Lipe, 50	72
Larrabee, D	3,000	27.2	4½x5¼	Continental, C4	C & S	Pierce	P	T—Bush	M—Bosch	Stromberg	M—Brown-Lipe	S-4	Brown-Lipe, 50	73
L. M. C		27.2	4½x5¼	Continental, C4	C & S	Pierce	P	T—Long	M—Bosch	Stromberg	P—Borg & Beck	S-4		74
Maccar, H	3,500	32.4	4½x5½	Continental, E4	C & S	Pierce	P	T—Own	M—Bosch	Stromberg	M—Brown-Lipe	S-3	Brown-Lipe, 50	75
Manly, 50	2,800	25.6	4 x5¾	Waukesha, BU4R	S	Waukesha		T—Chicago	M—Eisemann	Zenith	M—Fuller	S-4	Fuller	76
Mapleleaf, BB		27.2	4½x5¼		C & S				M—		P—	S-3		77
Midland, S	3,150	28.9	4¼x5½	Buda, HU	C	Duplex	P	T—Chicago	M—Eisemann	Stromberg	P—Borg & Beck	S-4	Brown-Lipe, 50	78
Moreland, 19C	3,775	28.9	4¼x5½	Continental, E4	C & S	N	P	C—Own	M—Dixie	Miller	M—Own	S-4	Own, 50	79
Netco, H	3,600	32.4	4½x5½	Continental, E4	C & S		P	T—Rome-T'r'y	M—Eisemann	Zenith	M—Brown-Lipe	S-4	Brown-Lipe, 50	80
Noble, D50	2,675	28.9	4¼x5½	Buda, HTU	C	Pierce	P	T—Chicago	M—Eisemann	Zenith	M—Fuller	S-4	Fuller, G	81
Old Reliable, B	3,250	28.9	4¼x6	Wisconsin, UU	C	Monarch	P	T—Chicago	M—Bosch	Stromberg	M—Fuller	S-4	Fuller, G	82
Paige, 50-18	3,150	27.2	4½x5¼	Continental, C2	C & S	Simplex	P	T—National	M—Bosch	Stromberg	M—Brown-Lipe	S-4	Brown-Lipe, 50	83
Patriot, Washi'gt'n	3,150	27.2	4½x5¼	Continental, C4	C & S	Pierce	P	T—Bremer	M—Bosch	Stromberg	P—Borg & Beck	S-4	Brown-Lipe, 50	84
Rennoc-Leslie, M	2,895	27.2	4½x5½	Buda		Pierce	P	T—Chicago	M—Splitdorf	Stromberg	M—Warner	S-4	Warner	85
Republic, 19	2,395	27.2	4¼x5¼	Continetnal, C2	C & S	Pharo	P	C—G & O	M—Eisemann	Stromberg	M—Fuller	S-4	Fuller	86
Rowe, CDW	3,250	25.6	4 x5	Wisconsin, EU	C	Simplex	P	C—Mayo	M—Bosch	Zenith	M—Brown-Lipe	S-4	Brown-Lipe, 50	87
Royal	3,500	28.9	4¼x6	Wisconsin		Monarch	T	T—Kells	M—Bosch	Stromberg	P—Borg & Beck	I-3	Own	88
Sandow, J	2,975	27.2	4½x5½	Continental, C4	C & S	Monarch	T	T—Chicago	M—Bosch	Stromberg	M—Brown-Lipe	S-4	Brown-Lipe, 35	89
Sanford, 25	3,000	27.2	4½x5¼	Continental, C4	C & S	Pierce	P	T—McCord	M—Bosch	Stromberg	P—Borg & Beck	S-4	Detroit	90

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TRUCK SPECIFICATIONS

4,000 (O.K.)—5,000 (Sanford)

Line number.	Final drive (Bevel-gear, Chain, External-gear, Internal-gear, Spur-and-bevel, Worm-gear).	Make of rear axle and model name or number.	Front springs (1, ½, or Full elliptic; Tranverse).	Rear springs (Cantilever; ½, ¼, or Full elliptic; Transverse.	Make of springs.	Service brake (Contracting, Expanding).	Emergency brake (Contracting, Expanding).	Wheels (Iron, Steel, Wood) and make.	Number and location of driving-wheels (All-around, Front, Rear)	Make of steering-gear.	Frame material Pressed-steel, Rolled-steel, Wood)	Make of frame.	Wheel-base in inches.	Is self-starter furnished? (Yes or No.)	Front tire size in inches (Dual, Pneumatic)	Rear tire size in inches (Dual, Pneumatic)	Brand-name and model name or number.
																	4,000 Pds.—Con.
1	W	Wisconsin, 900....	½	½	Tuthill.....	E	E	W—Bimel.....	2-R	Ross.....	P	Savage....	150	N	36x4	36x7	O. K.,2T
2	B	Own.....	½	½	Tuthill.....	C	C	W—Bimel.....	4-A	Ross.....	P	Smith.....	130	N	36x6p	36x6p	Oshkosh, A
3	W	Own.....	½	½	Tuthill.....	C	E	W—Bimel.....	4-A	Ross.....	P	Smith.....	165	Y	36x6p	36x6p	Oshkosh, AA
4	W	Own.....	½	½	.....	...	...	.....	2-R	.....	R	Own.....	144	N	34x4	34x4d	Packard, 2E
5	W	Own.....	½	½	Tuthill.....	E	E	W—Bimel.....	2-R	Ross.....	P	Own.....	150	Y	34x4	36x4d	Palmer
6	W	Own.....	½	½	Tuthill.....	C	E	W—Bimel.....	2-R	Ross.....	P	Smith.....	150	Y	34x4	36x4d	Parker, F9W
7	W	Own.....	½	½	Tuthill.....	C	E	W—Bimel.....	2-R	Ross.....	P	Smith.....	150	Y	34x4	36x4d	Parker. F9C
8	W	Own.....	½	½	.....	C	E	W—Own.....	2-R	Own.....	P	Own.....	150	N	36x4	36x4d	Pierce-Arrow, X4
9	W	Timken, 6552.....	½	½	Detroit.....	E	E	W—Hayes....	2-R	Ross.....	R	Own.....	150	N	36x4	36x4d	Power, B
10	W	Sheldon.....	½	½	Perfection...	E	E	W—Schwarz...	2-R	Ross.....	P	Parish.....	147	N	34x5	34x6	Rainier, R8
11	W	Timken.....	½	½	Sheldon.....	E	E	.....	2-R	Ross.....	R	Own.....	142	N	34x4	36x7	Rowe, CDW
12	W	Timken.....	.....	.....	Merrill.....	E	E	W—.....	2-R	Ross.....	R	Own.....	132	N	36x4 ½	36x6	Royal
13	I	Torbensen, C2....	½	½	Garden City.	C	E	W—Prudden..	2-R	Ross.....	P	Savage....	138	N	36x4	36x6	Sandow, I
14	W	Own.....	½	½	National....	C	E	W—.....	2-R	Own.....	R	Own.....	144	N	36x4	36x7	Schacht
15	W	Timken, 6552.....	½	½	Perfection...	E	E	W—Wayne....	2-R	Jacox.....	P	Parish & B.	150	N	36x4	36x7	Selden, JWB
16	W	Russel, T.....	½	½	Perfection...	C	E	W—Wayne....	2-R	Jacox.....	P	Parish & B.	150	N	36x4	36x7	Selden, JCB
17	W	Timken.....	.....	.....	Perfection...	...	...	W—.....	2-R	Gemmer.....	P	Smith.....	153	N	36x4	36x6	Shaw, M3
18	W	Timken, 6552.....	½	½	Perfection...	E	E	W—Hayes....	2-R	Lavine.....	P	Savage....	150	N	34x4	36x8	Signal, J
19	W	Timken, 6552.....	½	½	Perfection...	E	E	W—Hayes....	2-R	Ross.....	P	Savage....	180	N	34x4	36x8	Signal, JL
20	W	Timken.....	½	½	Tuthill.....	E	E	W—Hayes....	2-R	Ross.....	R	Own.....	140	N	36x4	36x6	Standard, 76
21	C	Own.....	.....	.....	Delaney.....	...	...	S—.....	2-R	Ross.....	R	Own.....	115	N	38x5	40x4d	Steele, C
22	I	Clark, 2-D.....	½	½	.....	C	E	W—Wayne....	2-R	Ross.....	P	.....	156	N	34x4	34x4d	Stewart, 7
23	W	Sheldon.....	½	½	.....	E	E	W—.....	2-R	.....	P	Smith.....	140 ½	N	36x4	36x7	Stoughton, D
24	W	Timken, 6552.....	½	½	Sheldon.....	E	E	W—Wayne....	2-R	Ross.....	R	Parish & B.	150	N	36x4	36x7	Sullivan, E
25	I	Torbensen, C2....	½	½	Tuthill.....	C	E	W—Schwarz...	2-R	Ross.....	P	Savage....	144	N	36x4	36x6	Superior, E
26	W	Timken, 6552.....	½	½	Detroit.....	E	E	W—Prudden..	2-R	Ross.....	P	Detroit....	146	N	36x4	36x7	Tower, F
27	I	Russel.....	½	½	Detroit.....	E	C	W—Royer....	2-R	Ditwiler....	R	Own.....	133	N	34x3 ½	34x5	Traffic, C
28	I	Clark, 2.....	½	½	Detroit.....	C	E	W—Hayes....	2-R	Gemmer....	R	Mason....	151	N	36x4	36x7	Triangle, B
29	C	Own.....	.....	.....	Kalamazoo..	E	E	W—.....	2-R	Lavine.....	P	.....	132	N	36x5	36x4d	Universal, D
30	W	Timken.....	½	½	Mather.....	E	E	W—Prudden..	2-R	Gemmer.....	P	Smith.....	152	N	36x4	36x7	Velie, 25B
31	W	Sheldon.....	½	½	Sheldon.....	E	E	I—Smith....	2-R	Gemmer.....	P	Own.....	142	N	36x4	36x6	Vim, 22
32	S	Own.....	½	½	.....	C	E	W—B. & St. M.	2-R	Own.....	P	.....	157 ½	N	36x4	6x7	White, 20
33	W	Sheldon.....	½	½	Detroit.....	E	E	W—Bimel.....	2-R	Ross.....	P	Own.....	144	N	36x4	36x6	Wichita, M
34	W	Timken, 6552.....	½	½	Perfection...	E	E	W—Bimel.....	2-R	Ross.....	R	Lackawana.	144	N	36x4	36x7	Wilson, R
35	I	Clark, 2.....	½	½	Mather.....	C	E	S—Own.....	2-R	Ross.....	R	Own.....	150	N	36x4	36x4d	Winther, 49
																	4,500 Pounds:
36	W	Own.....	½	½	Mather.....	E	E	W—.....	2-R	Ross.....	P	Own.....	160	N	36x4	36x7	Oneida, C-9
37	W	Timken, 6552.....	½	½	Sheldon.....	E	...	W—Bimel.....	2-R	Ross.....	P	Smith.....	144	N	36x3 ½	36x5	White Hickory, H
																	5,000 Pounds:
38	W	Timken.....	½	½	Mather.....	E	E	S—.....	2-R	Ross.....	P	Parish & B.	156	Y	36x4	36x7	Ace
39	I	Torbensen, C2....	½	½	Detroit.....	C	E	W—.....	2-R	Lavine.....	R	Own.....	150	N	36x4	36x6	Apex, E
40	W	Wisconsin, 900C...	½	½	Tuthill.....	E	E	W—Schwarz..	2-R	Lavine.....	R	Own.....	148	N	36x4	36x8	Available, 2 ½
41	I	Clark, 2.....	½	½	Higgins.....	C	E	W—Bimel.....	2-R	Lavine.....	P	Parish & B.	144	N	36x4	36x7	Beck, D
42	I	Russel.....	½	½	.....	...	...	W—.....	2-R	.....	...	.....	146	N	34x4	34x6	Bell
43	I	Torbensen.....	½	½	Perfection...	C	E	W—Schwarz...	2-R	Ross.....	P	Parish & B.	158	N	36x4	36x4d	Bessemer, J2
44	I	Russel, RS.....	½	½	Sheldon.....	C	E	W—Wayne....	2-R	Lavine.....	P	Own.....	144	Y	34x4	34x6	Bethlehem, E
45	W	.....	½	½	.....	E	E	W—.....	2-R	Ross.....	...	Detroit...	140	N	36x4	36x6	Brinton, F
46	W	Timken.....	½	½	Mather.....	E	E	W—.....	2-R	Gemmer.....	R	.....	144	N	36x4	36x7	Chicago, C-2 ½
47	W	Timken, 6552.....	½	½	Standard....	E	E	I—Smith.....	2-R	Ross.....	P	Parish & B.	163	N	36x4	36x8	Clydesdale, 65X
48	W	Timken.....	.....	.....	Perfection...	E	E	W—.....	2-R	Ross.....	P	Parish & B.	150	N	36x4	36x4d	Concord, B
49	W	Sheldon.....	½	½	Sheldon.....	E	E	W—Bimel.....	2-R	Ross.....	P	.....	148	N	36x4	36x8	Corbitt, B
50	W	Wisconsin, 900C...	½	½	Iron City....	E	E	W—Jones.....	2-R	Ross.....	P	Savage.....	150	N	36x4	36x7	Day-Elder, C
51	W	Standard, D.....	½	½	Cleveland...	E	E	W—Prudden..	2-R	.....	P	Smith.....	156	N	34x4	34x6	Dearborn, H
52	W	Timken, 6552-9 ¼.	½	½	Mather.....	E	E	W—Hayes....	2-R	Ross.....	P	Parish.....	146	N	36x4	36x6	DeKalb, E2 ½
53	I	Russel, U-300.....	½	½	Detroit.....	C	E	S—Dayton...	2-R	Gemmer.....	P	Detroit....	130	N	36x4	36x7	Denby, 25
54	W	.....	½	½	.....	E	E	W—.....	2-R	.....	P	.....	147	N	36x4	36x7	Dependable
55	C	.....	½	½	.....	E	E	W—.....	2-R	.....	P	.....	156	N	36x5	36x7	Doane
56	I	Torbensen.....	½	½	Own.....	C	E	W—.....	2-R	Ross.....	R	Own.....	130	N	36x6	40x8	Douglas, E
57	W	Timken.....	½	½	.....	E	E	W—.....	2-R	Ross.....	R	.....	144	N	34x4	36x7	Fageol
58	W	Sheldon, W-21....	½	½	Tuthill.....	E	E	W—Hayes....	2-R	Ross.....	P	Parish & B.	162	N	36x4	36x7	Gary, HU
59	W	Own, G1.....	½	½	Tuthill.....	C	E	W—Jones.....	2-R	Ross.....	R	Own.....	150	Y	36x4	36x7	Gersix, G
60	W	Own, G1.....	½	½	Tuthill.....	C	E	W—Jones.....	2-R	Ross.....	R	Own.....	150	N	36x4	36x7	Gersix, K
61	W	Sheldon, W-21....	½	½	.....	E	E	W—.....	2-R	Ross.....	P	.....	156	N	36x4	36x4d	Gramm-Berns'n, 25
62	W	Timken.....	.....	.....	Delaney.....	...	...	W—.....	2-R	Ross.....	P	Parish.....	145	N	36x4	36x4d	Hahn, E
63	W	Sheldon.....	½	½	Sheldon.....	E	E	W—Schwarz..	2-R	Ross.....	R	Own.....	150	N	36x4	36x7	Harvey, WFA
64	I	Clark, 2-D.....	½	½	Detroit.....	C	E	W—Bimel.....	2-R	Jacox.....	P	Savage....	168	N	36x4	36x7	Jumbo, D
65	W	Wisconsin, 900C...	½	½	Kalamazoo..	E	E	W—Bimel.....	2-R	Ross.....	R	Own.....	160	Y	36x4	36x4d	Kalamazoo, H
66	I	Russel, S.....	½	½	Temme.....	C	E	W—Bimel.....	2-R	Ross.....	R	Own.....	170	Y	34x4	34x6	Kankakee, E
67	C	Own, K-35.....	½	½	Perfection...	E	E	W—.....	2-R	Gemmer.....	P	Own.....	144	N	36x4	36x4d	Kelly-Spr'gf'd, K-35
68	W	Own, K-36.....	½	½	Perfection...	E	E	W—.....	2-R	Gemmer.....	P	Own.....	144	N	36x4	36x4d	Kelly-Spr'gf'd, K-36
69	W	Sheldon.....	.....	.....	.....	...	...	S—.....	2-R	Lavine.....	P	.....	154	N	36x4	36x7	Kimball, 6A
70	W	Sheldon.....	.....	.....	Betts.....	E	E	W—.....	2-R	Ross.....	R	Own.....	150	N	36x4	36x4d	Kleiber, B
71	W	Timken.....	½	½	Mather.....	E	E	W—Wayne....	2-R	Lavine.....	P	.....	162	N	36x4	36x7	Koehler, M
72	W	Sheldon, W-21....	½	½	Merrill.....	E	E	W—Hoopes...	2-R	Ross.....	P	Savage....	154	N	36x4	36x7	Larrabee, C
73	W	Sheldon, W-21....	¼	¼	Merrill.....	E	E	W—Hoopes...	2-R	Ross.....	P	Savage....	172	N	36x4	36x7	Larrabee, D
74	I	Russel.....	½	½	.....	C	E	W—.....	2-R	.....	R	.....	164	N	36x4	36x4d	L. M. C.
75	W	Timken, 6550.....	½	½	Merrill.....	E	E	W—Schwarz...	2-R	Ross.....	P	Parish.....	162	N	36x4	36x4d	Maccar, H
76	W	Wisconsin, 900C...	.....	.....	.....	E	E	W—.....	2-R	Lavine.....	...	.....	156	N	36x4	40x7	Manly, 50
77	W	.....	½	½	.....	...	...	W—.....	2-R	.....	P	.....	148	N	36x4	36x4d	Mapleleaf, B.B.
78	W	Sheldon, W21.....	½	½	Sheldon.....	E	E	I—Smith....	2-R	Ross.....	P	Parish & B.	150	N	36x4	36x7	Midland, S
79	W	Timken, 6552.....	½	½	U. S.....	E	E	I—Smith....	2-R	Ross.....	P	Smith.....	144	N	36x4	36x7	Moreland, 19C
80	W	Timken, 6552.....	½	½	Perfection...	E	E	W—.....	2-R	Ross.....	P	Parish & B.	168	N	36x4	36x8	Netco, H
81	W	Sheldon, W21.....	½	½	Tuthill.....	E	E	W—Bimel.....	2-R	Lavine.....	P	Parish & B.	156	N	36x4	36x8	Noble, D50
82	W	Sheldon, W21.....	½	½	Sheldon.....	E	E	W—St. Mary's.	2-R	Ross.....	R	Own.....	160	N	36x4	36x4d	Old Reliable, B
83	W	Timken, 6560....	½	½	Perfection...	E	E	S—Dayton....	2-R	Jacox.....	P	Parish.....	150	N	36x4	36x4d	Paige, 50-18
84	W	Empire, E18.....	½	½	.....	E	E	W—Bimel.....	2-R	Gemmer.....	P	.....	156	N	36x4	36x7	Patriot, Washingt'n
85	W	Wisconsin, 900C...	.....	.....	Rowland.....	E	E	W—.....	2-R	Lavine.....	...	Own.....	144	N	36x5	36x7	Rennoc-Leslie, M
86	I	Torbensen, C2....	½	½	Mather.....	C	E	W—Prudden..	2-R	Jacox.....	P	Savage....	144	N	36x4	36x7	Republic, 19
87	W	Sheldon, W-21....	½	½	Sheldon.....	E	E	.....	2-R	Ross.....	R	Own.....	164	N	34x4	36x4d	Rowe, CDW
88	W	Timken.....	.....	.....	Merrill.....	E	E	W—.....	2-R	Ross.....	R	Own.....	132 ½	N	36x4 ½	36x6	Royal
89	W	Timken.....	½	½	Garden City.	E	E	W—Prudden..	2-R	Ross.....	P	.....	165	N	.....	.....	Sandow, J
90	W	Sheldon.....	.....	.....	Perfection...	E	E	W—.....	2-R	Ross.....	P	Parish.....	156	N	36x4	36x4d	Sanford ,25

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5,000 (Schacht)—7,000 (Selden) INTERNAL-COMBUSTION

Brand-name and model name or number.	Price f. o. b. factory with seat and tires but without body.	Horse-power rating by S. A. E. formula.	Bore and stroke of engine in inches.	Make of engine and model name or number.	Lubrication (Circulating, Splash).	Make of governor (N indicates None).	Water-circulation (Pump, Thermo-siphon).	Radiator (Cellular, Tubular) and make.	Ignition system (Dry Cells, Magneto, Storage battery) and make of magneto.	Make of carbureter.	Clutch (Cone, Multiple-disk, Plate) and make.	Transmission (Individual-clutch, Planetary, Sliding-gear) and number of forward speeds.	Make of transmission and model name or number.	Line number.
5,000 Pds.—Con.														
Schacht	$3,650	28.9	4½x5½	Buda, HU	C	Duplex	P	T—Bremer	M—Bosch	Schebler	C—Hartford	S-3	Own, C	1
Schwartz, C	2,675	27.2	4½x5¼	Continental, C4	C & S	Pierce	P	C—Fedders	M—Bosch	Stromberg	M—Brown-Lipe	S-3	Brown-Lipe	2
Selden, 2¼A	3,290	27.2	4½x5¼	Continental, C4	F & S	Pierce	P	T—Bush	M—Eisemann	Stromberg	M—Brown-Lipe	S-4	Brown-Lipe	3
Service, 51	3,245	28.9	4½x5½	Buda, HU	C	Simplex	P	T—Long	M—Eisemann	Stromberg	P—Borg & Beck	S-4	Brown-Lipe, 50	4
Sterling	3,475	30.6	4½x5¼	Own	C	Waukesha	P	C—Own	M—Eisemann	Rayfield	M—Brown-Lipe	S-3	Brown-Lipe, 50	5
Stoughton, E		28.9	4½x5½		C		P	T—	M—Eisemann	Stromberg	M—	S-4	Brown-Lipe	6
Tiffin, MW	3,050	27.2	4½x5½	Continental, C4	C & S	Pierce	P	T—Chicago	M—Bosch	Schebler	M—Fuller	S-3	Fuller	7
Transport, 50	2,585	27.2	4½x5½	Continental, C2	C & S	Duplex	P	C—	M—Eisemann	Stromberg	M—Fuller	S-4	Fuller, GU4	8
Ultimate, B		28.9	4½x5½		C		P	T—	M—		M—	S-4		9
Union, B	2,375	25.6	4 x6	Wisconsin, TAU	C	Duplex	P	T—G & O	M—Eisemann	Schebler	M—Fuller	S-4	Fuller, GU	10
United, B		28.9	4½x5½	Buda, HU	C	Simplex	P	T—G & O	M—Bosch	Stromberg	M—Brown-Lipe	S-4	Brown-Lipe, 35	11
U. S., E	2,800	27.2	4½x5¼	Continental, C4	C & S	Pierce	P	T—Long	M—Eisemann	Stromberg	C—Hartford	I-3	Cotta, CCAU	12
U. S., H	3,250	27.2	4½x5¼	Continental, C4	C & S	Pierce	P	T—Long	M—Eisemann	Stromberg	C—Hartford	S-4	Brown-Lipe, 50	13
Walker-Johnson, B		28.9	4½x5½	Buda, HTU	C	Pierce	P	T—	M—Eisemann	Zenith	M—	S-4		14
Ward LaFrance, 2A	3,350	27.2	4½x5¼		C & S	Simplex	P	T—Own	S—	Zenith	M—	S-4	Brown-Lipe 50	15
Watson		28.9	4½x5½	Waukesha		Waukesha		T—	M—		M—Brown-Lipe	S-4	Brown-Lipe	16
White Hickory, K		27.2	4½x5¼	Continental, C2	C & S	Simplex	P	T—Chicago	M—Eisemann	Stromberg	M—	S-4	Fuller	17
Wichita, R	2,950	22.5	3¾x5¼	Waukesha, BX	C & S	Waukesha	P	C—Perfex	M—Eisemann	Stromberg	C—Own	S-4	Brown-Lipe	18
Wichita, RX	3,400	32.4	4½x5¾	Waukesha, N	C & S	Waukesha	P	C—Eng. & M	M—Eisemann	Stromberg	C—Own	S-4	Brown-Lipe	19
Wilcox, C		28.9	4½x5	Own	S	Pierce	P	T—Own	M—Bosch	Stromberg	M—Own	S-4	Own	20
Wisconsin, C	3,850	25.6	4 x5¾	Waukesha		Waukesha	P	T—Chicago	M—Eisemann	Master	M—Fuller	S-3	Fuller	21
Witt-Will, WD2-19	2,950	27.2	4½x5¼	Continental, C4	C & S	Pierce	P	C—National	M—Eisemann	Zenith	M—Brown-Lipe	S-3	Brown-Lipe	22
6,000 Pounds:														
Beech Creek, 3A	3,850	28.9	4½x5¾	Waukesha		Waukesha	P		M—Eisemann	Kingston	P—Borg & Beck	S-6	Own	23
FWD, B	4,500	36.1	4¾x5½	Wisconsin, A	C & S	Pierce	P	T—Long	M—Eisemann	Stromberg	M—Hele-Shaw	I-3	Cotta, DAF	24
O.K., 3T	3,350	28.9	4½x5½	Buda	C	Pierce	P	T—Chicago	M—Eisemann	Zenith	M—Fuller	S-4	Fuller	25
Packard, 3E	4,350	32.4	4½x5½	Own	C	Own	P	T—Fedders	M—Dixie	Own	M—Own	S-4	Own	26
Parker	3,700	29.4	3½x5¼	Continental, 9N	C & S	Pierce	P	T—Bremer	M—Bosch	Stromberg	M—Brown-Lipe	S-3	Fuller	27
Riker, B	4,600	28.9	4½x6	Own	C	Own		T—G & O	M—Berling	Own	C—Own	S-4	Own	28
Schleicher	3,675	32.4	4½x5½	Continental, E4	C & S				M—Bosch	Stromberg			Own	29
Steele, B	3,000	40.0	5 x5	Own		Own	P	C—	M—Eisemann	Stromberg	M—Hele-Shaw	I-3	Cotta	30
Vim, 23	3,950	28.9	4½x5½	Hercules	C	Duplex	P	T—McCord	M—Dixie	Zenith	M—Brown-Lipe	S-4	Brown-Lipe, 50	31
Winther, 69	3,900	25.6	4 x6	Wisconsin, TU	C	N	P	T—Bremer	M—Eisemann	Master	P—Borg & Beck	S-4	Brown-Lipe, 50	32
7,000 Pounds:														
Acason, L		28.9	4½x6¾	Waukesha, LU7	S	Waukesha	P	C—G & O	M—Eisemann	Stromberg	M—Muncie	S-4	Muncie, T63	33
Acme	3,750	32.4	4½x5½	Continental, E7	C & S	Duplex	P	T—G & O	M—Eisemann	Rayfield	P—Borg & Beck	I-3	Cotta, DA	34
All-Power		32.4	4½x5½	Continental, E4	C & S			T—	M—Eisemann		M—Brown-Lipe	I-3	Cotta	35
Armleder, KW		32.4	4½x5½	Continental, E4	C & S	Monarch	P	T—Long	M—Bosch	Zenith	M—Brown-Lipe	S-3	Brown-Lipe	36
Atterbury, 7D	3,875	32.4	4½x5¼	Continental, E4	C & S	Monarch	P	T—Long	M—Eisemann	Zenith	M—Brown-Lipe	S-4	Brown-Lipe, 50	37
Available, 3	4,200	32.4	4½x5½	Continental, E4	C & S	Pierce	P	T—Chicago	M—Bosch	Stromberg	M—Brown-Lipe	S-4	Brown-Lipe	38
Bessemer, K	3,450	32.4	4½x5½	Continental, E7	C & S	Pierce	P	C—Ideal	M—Bosch	Rayfield	P—Borg & Beck	S-4	Brown-Lipe, 60	39
Bethlehem, F	3,465	30.6	4½x6	Own	C & S	Monarch	P	C—Fedders	S—	Schebler	P—Borg & Beck	S-3	Detroit, CX	40
Brockway, R	3,900	32.4	4½x5½	Continental, E4	C & S	N	P	T—Bush	M—Eisemann	Schebler	M—Brown-Lipe	S-4	Brown-Lipe, 50	41
Chicago, C-3½	4,300	28.9	4½x5¼	Hercules, M3½	C	Pierce	P	T—	M—Bosch	Zenith	M—Brown-Lipe	S-4	Brown-Lipe, 50	42
Clydesdale, 90		32.4	4½x5½	Continental, E4	C & S	Own	P	T—Own	M—Bosch	Zenith	M—Brown-Lipe	S-4	Brown-Lipe, 60	43
Corbitt, A	4,200	32.4	4½x5½	Continental, E4	C & S	Duplex	P	T—Rome-T'r'y	M—Eisemann	Stromberg	H—Hele-Shaw	S-3	Cotta	44
Couple-Gear	6,000	36.1	4¾x6	Continental, B2	C				M—Eisemann	Stromberg		-1		45
Dart, L	4,000	32.5	4½x6	Buda, YU	C	Simplex	P	C—Ideal	M—Eisemann	Zenith	M—Warner	S-4	Warner, T53	46
Day-Elder, F	3,350	32.4	4½x5½	Continental, E4	C & S	Monarch	P	T—Bush	M—Berling	Zenith	M—Brown-Lipe	S-4	Brown-Lipe, 50	47
Denby, 27	4,250	32.4	4½x5½	Continental, E7	C & S	Duplex	P	T—Long	M—Eisemann	Stromberg	M—Own	S-4	Warner, AT53	48
Diamond-T, LB	4,390	32.4	4½x5½	Continental, E4	C & S	Pierce	P	T—G & O	M—Bosch	Stromberg	M—Brown-Lipe	S-4	Brown-Lipe, 50	49
Dorris, K7	4,200	28.9	4½x5½	Own, K7	C	Own	P	T—McCord	M—Bosch	Stromberg	M—Warner	S-4	Warner, T53	50
Duplex, E	4,000	28.0	4½x5½	Buda	S	Simplex	P	T—Long	M—Eisemann	Schebler	M—Brown-Lipe	S-4	Brown-Lipe, 50	51
Fageol	4,500	36.1	4¾x6¾				P		M—	Zenith	P—	S-3		52
Federal, W	3,350	32.4	4½x5½	Continental, E4	C & S	Monarch	P	C—Own	M—Eisemann	Zenith	P—Borg & Beck	S-4	Own	53
Garford, 77C	4,300	36.1	4½x5½	Wisconsin, AU	C & S	Simplex	P	T—Own	M—Eisemann	Rayfield	M—Brown-Lipe	S-4	Brown-Lipe	54
Gary, K		32.4	4½x6	Buda, YU	C	Simplex	P	T—Chicago	M—Eisemann	Master	M—Warner	S-4	Warner, T53	55
Giant, 17	3,750	32.4	4½x5½	Continental, E4	C & S	Pierce	P	C—Own	M—Eisemann	Stromberg	M—Warner	S-4	Warner, T55	56
GMC, 71	3,950	32.4	4½x5½	Continental, E4	C & S	Monarch	P	T—Own	M—Eisemann	Marvel	M—Own	S-4	Own	57
Gramm-Berns'n, 35	4,450	32.4	4½x5½	Waukesha, N	C & S	Waukesha	P	T—Own	M—Eisemann	Stromberg	M—Own	I-4	Own	58
Hall	3,750	32.4	4½x5½	Continental, E4	C & S	Duplex	P	T—Long	M—Eisemann	Zenith	M—Brown-Lipe	S-4	Brown-Lipe	59
Harvey, WHA	3,900	32.4	4½x6	Buda	C	Duplex	P	T—Chicago	M—Eisemann	Stromberg	P—Borg & Beck	S-4	Brown-Lipe	60
Hendrickson	3,800	32.4	4½x5¾	Buda		Pierce	P	T—Chicago	M—Dixie	Stromberg	M—Fuller	S-4	Fuller	61
Hurlburt, 3	4,250	32.5	4½x6	Buda, YU	C	Duplex	P	T—G & O	M—Eisemann	Flechter	M—Brown-Lipe	S-3	Brown-Lipe	62
Indiana, R	3,450	30.6	4½x5½	Rutenber, 40	C	Pierce	P	T—Long	M—Eisemann	Stromberg	P—Borg & Beck	S-4	Brown-Lipe, 50	63
Jackson, B	4,250	32.4	4½x5½	Continental, E4	C & S	Pierce		T—	M—Eisemann	Stromberg	P—Borg & Beck	S-4		64
Kalamazoo, K	3,900	28.9	4½x5½	Buda, HTU	C	Pierce	P	C—Hooven	M—Bosch	Stromberg	M—	S-4	Fuller, G	65
Kelly-Spr'gf'ld, K40	4,400	32.4	4½x6½	Own	C	Own	P	C—Own	M—Eisemann	Rayfield	C—Own	S-3	Covert, K	66
King-Zeitler	4,200	32.4	4½x5½	Continental, E4	C & S	Pierce	P	T—Chicago	M—Bosch	Stromberg	M—Brown-Lipe	S-4	Brown-Lipe, 50	67
Kissel, Heavy Duty	3,905	28.9	4½x5½	Own	C & S	Pierce	P	T—McCord	M—Eisemann	Stromberg	M—Warner	S-4	Warner, T53	68
Kleiber, C	4,100	32.4	4½x5½	Continental, E4	C & S	Pierce	P	T—Rome-T'r'y	M—Bosch	Stromberg	M—Hele-Shaw	S-4	Brown-Lipe	69
Lexrabee, B	3,950	32.4	4½x5½	Continental, E4	C & S	Pierce	P	T—Bush	M—Bosch	Stromberg	M—Fuller	S-4	Brown-Lipe, 50	70
Lexrabee, A	3,950	32.4	4½x5½	Continental, E4	C & S	Pierce	P	T—Bush	M—Bosch	Stromberg	M—Brown-Lipe	S-4	Brown-Lipe, 50	71
Maccar, M	4,300	32.4	4½x5½	Continental, E4	C & S	Pierce	P	T—Own	M—Bosch	Stromberg	M—Brown-Lipe	S-3	Brown-Lipe, 50	72
Mack, AC	4,950	40.0	5 x6	Own	C & S	Own	P	T—Own	D M—Splitdorf	Zenith	M—Own	S-3	Own	73
Mapleleaf, CC		32.4	4½x5½		C & S				M—		M—	S-4		74
Master, A	3,900	32.5	4½x6	Buda, YU	C	Pierce	P	T—Chicago	M—Eisemann	Master	P—Brown-Lipe	S-4	Brown-Lipe	75
Menominee, G		32.4	4½x5½	Continental, E4	C & S	Monarch	P	T—G & O	M—Eisemann	Stromberg	M—Brown-Lipe	I-	Cotta, DA	76
Nelson LeM'n, F3½	3,750	32.4	4½x5½	Continental, E4	C & S	Pierce	P	T—Chicago	M—Bosch	Stromberg	P—Borg & Beck	S-4	Brown-Lipe, 50	77
Noble, E70		32.4	4½x6	Buda, YTU	C	Pierce	P	T—Chicago	M—Eisemann	Stromberg	M—Fuller	S-4	Fuller, G5	78
Northway, B-3		25.6	4 x6			Pierce		C—	M—		M—	S-4		79
Old Reliable, C	4,000	28.9	4½x6	Wisconsin, UU	C	Monarch	P	T—Chicago	M—Bosch	Stromberg	M—Fuller	S-4	Fuller, C	80
Oneida, D-9	3,800	32.4	4½x5½	Own	C & S	Own	P	T—Modine	M—Bosch	Stromberg	M—Own	I-4	Own	81
Paige, 51-18	4,150	32.4	4½x5½	Continental, E7	C & S	Simplex	P	T—National	M—Bosch	Stromberg	M—Brown-Lipe	S-4	Brown-Lipe, 50	82
Parker, J9	4,400	32.4	4½x6	Wisconsin, VAU	C & S	Monarch	P	T—Bremer	M—Bosch	Stromberg	M—Brown-Lipe	S-4	Warner	83
Republic, 20	3,595	32.4	4½x5½	Continental, E4	C & S	Pharo	P	T—G & O	M—Eisemann	Stromberg	M—Fuller	S-4	Fuller	84
Rowe, DEW	3,800	40.0	4 x6	Wisconsin, TU	C	Simplex	P	C—Mayo	M—Bosch	Zenith	M—Brown-Lipe	S-4	Brown-Lipe, 50	85
Royal	4,200	32.4	4½x6	Wisconsin		Monarch	P	T—Kells	M—Bosch	Stromberg	P—Borg & Beck	I-3	Own	86
Sandow	4,250	32.4	4½x5½	Continental, E4	C & S	Monarch	P	T—Chicago	M—Bosch	Stromberg	M—Brown-Lipe	S-4	Brown-Lipe	87
Sanford, 35	3,975	32.4	4½x5½	Continental, E4	C & S	Pierce	P	T—McCord	M—Bosch	Stromberg	P—Borg & Beck	S-4	Warner	88
Schacht	4,180	32.4	4½x6	Buda, YTU	C	Duplex	P	T—Bremer	M—Bosch	Schebler	C—Hartford	S-4	Own, C	89
Selden, 3¼A		32.4	4½x5½	Continental, E4	C & S	Pierce	P	T—Bush	M—Eisemann	Stromberg	M—Brown-Lipe	S-4	Brown-Lipe, 50	90

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TRUCK SPECIFICATIONS

5,000 (Schacht)—7,000 (Selden)

Line number.	Final drive (Bevel-gear, Chain, External-gear, Internal-gear, Spur-and-bevel, Worm-gear).	Make of rear axle and model name or number.	Front springs (S., ¾, or Full elliptic; Transverse).	Rear springs (Cantilever; ¾, ¼, or Full elliptic; Transverse.	Make of springs.	Service brake (Contracting, Expanding).	Emergency brake (Contracting, Expanding).	Wheels (Iron, Steel, Wood) and make.	Number and location of driving-wheels (All-around, Front, Rear).	Make of steering-gear.	Frame material Pressed-steel, Rolled-steel, Wood).	Make of frame.	Wheel-base in inches.	1s self-starter furnished? (Yes or No.)	Front tire size in inches (Dual, Pneumatic)	Rear tire size in inches (Dual, Pneumatic)	Brand-name and model name or number.
																	5,000 Pds.—Con.
1	W	Own, C	½	½	National	C	E	W—	2-R	Own	R	Own	156	N	36x4	36x4d	Schacht
2	I	Torbensen	½	½	Rowland	E	E	W—Schwarz	2-R	Ross	P	Parish	150	N	36x4	36x7	Schwartz, C
3	W	Timken	½	½	Perfection	E	E	W—Wayne	2-R	Gemmer	P	Parish & B.	145	Y	36x4	36x7	Selden, 2½A
4	W	Timken, 6560	½	½	Mather	E	E	W—Bimel	2-R	Ross	P	Savage	160	N	36x4	36x7	Service, 51
5	W	Timken, 1540	½	½	Mather	E	E	W—Prudden	2-R	Ross	PW	Own	156	N	36x4	36x4d	Sterling
6	W	Sheldon	½	½		E	E	W—	2-R		P	Smith	155	N	36x4	36x4d	Stoughton, E
7	W	Sheldon			Kalamazoo	E	E	W—Bimel	2-R	Ross	P	Parish & B.	148	N	36x4	36x3½d	Tiffin, MW
8	I	Clark, 2	½		Detroit	E	E	W—Bimel	2-R	Jacox	P		150	N	36x4	36x6	Transport, 5
9	W		½	½		C	E	W—	2-R		P		154	N	36x4	36x4d	Ultimate, B
10	I	Russel, T	½	½	Mather	C	E	W—Prudden	2-R	Ross	P	Smith	152	N	36x4	36x7	Union, B
11	I	Clark, 2D	½	½	Detroit	E	C	W—	2-R	Jacox	P	Detroit	151	N	36x4	36x7	United, B
12	C	Own	½	½	Tuthill	C	E	W—Schwarz	2-R	Lavine	P	Own	144	N	34x4	36x4d	U. S., E
13	W	Sheldon W-21	½	½	Sheldon	E	E	W—Schwarz	2 R	Lavine	P	Own	145	N	34x4	36x4d	U. S., H
14	W	Timken	½	½		E	E	W—	2-R	Ross			150	N	36x4	36x8	Walker-Johnson, B
15	W	Timken, 6552	½	½		E	E	W—	2-R	Ross	P	Own	154	N	36x4	36x7	Ward LaFrance, 2A
16	W		½	½	Sheldon	E	E		2-R	Gemmer	P		156	N	36x4	36x7	Watson
17	W	Timken	½	½		E	E	W—	2-R		P		150	N	36x4	36x7	White Hickory, K
18	W	Sheldon	½	½	Detroit	E	E	W—Bimel	2-R	Ross	P	Own	144	N	36x4	36x8	Wichita, R
19	W	Sheldon	½	½	Detroit	E	E	W—Bimel	2-R	Ross	P	Own	144	N	36x4	36x8	Wichita, RX
20	W	Wisconsin, 900C	½	½	Sheldon	E	E	I—Smith	2 R	Own	P	Own	150	N	36x4	36x3½d	Wilcox, C
21	W	Sheldon				E	E	W—	2-R	Lavine	P	Smith	156	N	36x4	36x6	Wisconsin, C
22	W	Timken			Sheldon	E	E	W—	2-R	Ross	P		144	N	36x3½	36x3½d	Witt-Will, WD2-19
																	6,000 Pounds:
23	B	Own				C	C		2-R	Own			132	N	36x6	36x6	Beech Creek, 3A
24	B	Own	½	½	Tuthill	C	C	W—Schwarz	4-A	Ross	P	Parish	124	N	36x6	36x6	FWD, B
25	W	Wisconsin, 900	½	½	Tuthill	C	E	W—	2-R	Ross	P	Savage	154	N	36x4	36x8	O. K., 3T
26	W	Own	½	½		C	E	W—Prudden	2-R		R	Own	156	N	36x5	36x5d	Packard, 3E
27	W	Own	½	½	Tuthill	C	E	W—Bimel	2-R	Ross	P	Own	160	Y	34x4	36x5d	Parker
28	W	Own	½	½	Spring Perch	C	E	W—Jones	2-R	Ross	P	Parish	150	N	36x5	36x5d	Riker, B
29	C	Own	½	½					2-R				150	N	34x4½	34x3½d	Schleicher
30	C	Own			Delaney			S—	2-R	Ross	R	Own	127	N	38x6	40x6d	Steele, B
31	W	Sheldon	½	½	Sheldon	E	E	I—Smith	2-R	Gemmer	R	Own	175	N	36x5	36x5d	Vim, 23
32	I	Clark, 3	½	½	Mather	C	E	S—Own	2-R	Ross	R	Own	150	N	36x5	36x5d	Winther, 69
																	7,000 Pounds:
33	W	Timken, 6652	½	½	Detroit	E	E	W—Hayes	2-R	Ross	P	Savage	172	N	36x5	36x5d	Acason, L
34	W	Timken, 6652	½	½	Detroit	E	E	W—Hayes	2-R	Ross	P	Smith	168	N	36x5	40x5d	Acme
35	W	Timken	½	½		E	E	S—Budd	4-A				166	Y	36x5d	36x10	All-Power
36	W	Timken, 6650	½	½	Mather	C	E	W—St. Mary's	2-R	Ross	R		156	N	36x5	36x5d	Armleder, KW
37	W	Timken, 6652	½	½	Spring Perch	E	E	W—Bimel	2-R	Gemmer	P	Savage	167½	N	36x5	40x5d	Atterbury, 7D
38	W	Timken	½	½	Tuthill	E	C	W—Schwarz	2-R	Lavine	R	Own	156	N	36x5	40x5d	Available, 3
39	I	Torbensen, E	½	½	Perfection	E	C	I—Smith	2-R	Ross	P	Parish & B.	175	N	36x5	36x5d	Bessemer, K
40	I	Russel, T	½	½	Sheldon	E	E	W—Wayne	2-R	Lavine	P	Detroit	162	Y	34x4	34x5d	Bethlehem, F
41	W	Timken, 6652	½	½	Merrill	E	E	W—Hoopes	2-R	Gemmer	P	Parish	164	N	36x5	36x5d	Brockway, R
42	W	Timken	½	½	Mather	E	E	W—	2-R	Gemmer	R		168	N	36x5	36x10	Chicago, C-3½
43	W	Timken, 6652	½	½	Standard	E	E	I—Smith	2-R	Ross	P	Parish & B.	180	N	36x5	40x5d	Clydesdale, 90
44	W	Sheldon	½	½	Sheldon	E	E	S—Smith	2-R	Ross	R		168	N	36x5	36x5d	Corbitt, A
45	B	Own	½	½	Tuthill	C			4-A	Own			144	N	36x4d	36x4d	Couple-Gear
46	W	Timken, 6652	½	½	Perfection	E	E	W—Prudden	2-R	Ross	R	Savage	160	N	36x5	36x10	Dart, L
47	W	Wisconsin, 900D	½	½	Iron City	E	E	W—Jones	2-R	Ross	P	Savage	150	N	36x5	36x5d	Day-Elder, F
48	I	Clark, 3	½	½	Detroit	C	E	I—Smith	2-R	Ross	P	Detroit	170	N	36x5	36x10	Denby, 27
49	W	Timken, 6652	½	½	Mather	E	E	W—Prudden	2-R	Gemmer	P	Smith	170	N	36x5	36x5d	Diamond T, LB
50	W	Timken, 6652	½	½	Rowland	E	E	W—Hayes	2-R	Ross	P	Smith	154	N	36x5	36x10	Dorris, K7
51	I	Own	½	½	Tuthill	C	E	W—Prudden	4-A	Jacox	P	Parish	130	N	36x6	36x6	Duplex, E
52	W	Timken	½	½		C	E	W—	2-R		P		172	N	36x5	36x5d	Fageol
53	W	Timken, 6652	½	½	Mather	E	E	W—	2-R	Gemmer	R		156	N	36x5	36x5d	Federal, W
54	W	Timken, 6652	½	½	Perfection	E	E	W—	2-R	Ross	P	Own	128	N	36x5	40x5d	Garford, 77C
55	W	Sheldon, W-30	½	½	Tuthill	E	E	W—Hayes	2-R	Ross	P	Own	162	N	36x5	36x5d	Gary, K
56	W	Timken, 6652	½	½	Detroit	E	E	W—Prudden	2-R	Ross	R	Hydraulic	176	N	36x5	36x5d	Giant, 17
57	W	Timken, 6652	½	½	Detroit	E	E	S—Own	2-R	Jacox	P	Own	163	N	36x5	40x5d	GMC, 71
58	W	Sheldon, W-30	½	½		E	E	I—Smith	2-R	Ross	R		156	N	36x5	40x5d	Gramm-Berns'n, 35
59	W	Timken	½	½	Detroit	E	E	I—Smith	2-R	Gemmer	R	Own		N	36x5	36x5	Hall
60	W	Sheldon	½	½	Sheldon	E	E	W—Schwarz	2-R	Ross	R	Own	160	N	36x5	36x5d	Harvey, WHA
61	W	Timken	½	½	Tuthill	E	E	W—	2-R	Ross			160	N	36x5	36x5d	Hendrickson
62	W	Own	½	½	Merrill	E	E	W—Wayne	2-R	Ross	P	Parish	146	N	36x5	36x5d	Hurlburt, 3
63	W	Sheldon, W30	½	½		E	E	W—Bimel	2-R	Wohlrab	R	Own	156	N	36x5	36x5d	Indiana, R
64			½	½		E	C	W—	4-A	Ross	P		150	Y	36x7	36x7	Jackson, B
65	W	Sheldon, W30	½	½	Kalamazoo	E	E	W—Bimel	2-R	Ross	R	Own	160	Y	36x5	36x5d	Kalamazoo, K
66	C	Own	½	½	Perfection	E	E	W—	2-R	Gemmer	P	Own	150	N	36x5	40x6d	Kelly-Sp'gfi'd, K40
67	W	Timken	½	½	Tuthill	E	E	W—St. Mary's	2-R	Lavine	R	Own	172	N	36x5	40x5d	King-Zeitler
68	W	Sheldon, W30	½	½	Sheldon	E	E	I—Smith	2-R	Ross	P	Smith	168	N	36x5	36x5d	Kissel, Heavy Duty
69	W	Timken	½	½	Betts	E	E	W—	2-R	Ross	P	Own	158	N	36x5	36x5d	Kleiber, C
70	W	Sheldon, W-30	½	½	Merrill	E	E	W—Hoopes	2-R	Ross	P	Savage	154	N	36x5	36x5d	Larrabee, B
71	W	Sheldon, W-30	½	½	Merrill	E	E	W—Hoopes	2-R	Ross	P	Savage	172	N	36x5	36x5d	Larrabee, A
72	W	Timken, 6552	½	½	Merrill	E	E	W—Schwarz	2-R	Ross	P	Parish	174	N	36x5	36x5d	Maccar, M
73	C	Own	½	½	Merrill	C	E	W—Schwarz	2-R	Gemmer	P	Own	Opt'nal	N	36x5	40x5d	Mack, AC
74	W		½	½				W—	2-R		P		158	N	36x5	36x5d	Mapleleaf, CC
75	W	Timken	½	½	Detroit	E	E	W—Prudden	2-R	Ross	P	Parish & B.	158	N	36x5	40x5d	Master, A
76	W	Timken, 6652	½	½	Tuthill	E	E	W—Standard	2-R	Ross	R	Own	160	N	36x5	36x5d	Menominee, G
77	W	Timken, 6652	½	½	Tuthill	E	E	W—Prudden	2-R	Lavine	R	Own		N	36x5	36x5d	Nelson LeM'n, F3½
78	W	Sheldon, W30	½	½	Tuthill	E	E	W—Bimel	2-R	Lavine	P	Parish & B.	166	N	36x5	36x5d	Noble, E70
79	W		½	½		E	E	W—	2-R	Ross	P		160	Y	36x5	36x5d	Northway, B-3
80	W	Sheldon, W30	½	½	Sheldon	E	E	W—St. Mary's	2-R	Ross	R	Own	160	N	36x5	36x5	Old Reliable, C
81	W	Own	½	½	Mather	E	E	S—	2-R	Ross	P	Own	170	N	36x5	36x10	Oneida, D-9
82	W	Timken, 6652	½	½	Perfection	E	E	S—Own	2-R	Jacox	P	Parish	160	N	36x5	36x5d	Paige, 51-18
83	W	Own	½	½	Tuthill	C	E	W—Bimel	2-R	Ross	P	Smith	160	Y	36x5	40x5d	Parker, J9
84	I	Torbensen, E	½	½		C	E	I—Smith	2-R	Jacox	P	Savage	165	N	36x5	36x10	Republic, 20
85	W	Sheldon, W-30	½	½	Sheldon	E	E		2-R	Ross	P	Own	156	N	36x5	36x5d	Rowe, DEW
86	W	Timken	½	½	Merrill	E	E	W—	2-R	Ross	R	Own	158	N	36x5	38x5d	Royal
87	W	Timken	½	½	Garden City	E	E	W—Prudden	2-R	Ross	P	Savage	175	N	36x6	36x5d	Sandow
88	W	Sheldon	½	½	Perfection	E	E	W—	2-R	Ross	P	Parish	174	N	36x5	36x5d	Sanford, 35
89	W	Own	½	½		E	C	W—	2-R	Own	R	Own	168	N	36x5	36x5d	Schacht
90	W	Timken, 6652	½	½	Perfection	E	E	W—Wayne	2-R	Gemmer	P	Parish & B.	164	N	36x5	36x5d	Selden, 3½A

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7,000 (Service)—10,000 (Sterling) INTERNAL-COMBUSTION

Brand-name and model name or number.	Price f. o. b. factory with seat and tires but without body.	Horse-power rating by S. A. E. formula.	Bore and stroke of engine in inches.	Make of engine and model name or number.	Lubrication (Circulating, Splash).	Make of governor (N indicates None).	Water-circulation (Pump, Thermo-siphon).	Radiator (Cellular, Tubular) and make.	Ignition system (Dry Cells, Magneto, Storage battery) and make of magneto.	Make of carbureter.	Clutch (Cone, Multiple-disk, Plate) and make.	Transmission (Individual-clutch, Planetary, Sliding-gear) and number of forward speeds.	Make of transmission and model name or number.	Line number.
7,000 Pds.—Con.														
Service, 71	$4,085	28.9	4½x5½	Buda, HU	C	Simplex	P	T—Long	M—Eisemann	Stromberg	P—Borg & Beck	S-4	Brown-Lipe, 60..	1
Service, 76	4,285	32.4	4½x6	Buda, YU	C	Simplex	P	T—Long	M—Eisemann	Stromberg	P—Borg & Beck	S-4	Brown-Lipe, 60..	2
Signal, M	4,100	32.4	4½x5½	Continental, E4.	C & S	Pierce	P	T—McCord	M—Eisemann	Stromberg	M—Brown-Lipe.	S-4	Brown-Lipe, 60..	3
Signal, ML	4,200	32.4	4½x5½	Continental, E4.	C & S	Pierce	P	T—McCord	M—Eisemann	Stromberg	M—Brown-Lipe.	S-4	Brown-Lipe, 60..	4
Standard, 66	3,675	32.4	4½x5½	Continental, E7.	C & S	Monarch	P	T—McCord	M—Eisemann	Stromberg	M—Brown-Lipe.	S-4	Brown-Lipe, 50..	5
Sterling	4,550	30.6	4½x5¾	Own	C	Waukesha	P	C—Own	M—Eisemann	Rayfield	M—Hele-Shaw	I-3	Own	6
Stewart, 10	3,500	32.5	4½x5½	Continental, E7.	C& S	Pierce	P	T—Bush	M—Eisemann	Zenith	M—Fuller	S-4	Fuller, GU4	7
Tiffin, PW	3,980	32.4	4½x5½	Continental, E4.	C & S	Pierce	P	T—G & O	M—Bosch	Schebler	P—Borg & Beck.	S-3	Fuller	8
Titan	4,300	32.4	4½x6	Buda, YU	C	Simplex	P	T—G & O	M—Eisemann	Stromberg		I	Cotta	9
Tower, G	4,100	32.4	4½x5½	Continental, E4.	C & S	Pierce	P	T—Own	M—Bosch	Stromberg	M—Fuller	S-4	Fuller, GU	10
Twin City	4,750	42.0	5½x6	Wisconsin, JAU.	C	Pierce	P	C—	—K-W	Stromberg	M—Hele-Shaw	I-3	Cotta	11
United, C		28.9	4¾x5½	Buda, HU	C	Simplex	P	T—G & O	M—Bosch	Stromberg	M—B.own-Lipe.	S-4	Brown-Lipe, 35..	12
Universal, L		28.9	4½x5½	Buda		Monarch	P	T—Long	M—Eisemann	Zenith	M—Own	S-3	Own	13
U. S., D	3,550	32.4	4½x5½	Continental, E4.	C & S	Pierce	P	T—Long	M—Eisemann	Stromberg	C—Hartford	S-3	Cotta, OCAU	14
U. S., J	3,950	32.4	4½x5½	Continental, E4.	C & S	Pierce	P	T—Long	M—Eisemann	Stromberg	C—Hartford	S-4	Brown-Lipe, 60..	15
Velie, 26B	3,900	32.4	4½x5½	Continental, E4.	C & S	Pierce	P	T—Own	M—Bosch	Stromberg	M—Brown-Lipe.	S-4	Brown-Lipe, 60..	16
Victor, M	3,800	32.4	4½x5½	Continental, E4.	C & S		P	—Own	M—Bosch	Stromberg	M—Brown-Lipe.	S-4	Brown-Lipe	17
Walter, MO3		30.6	4¾x6	Own	C & S	Own	P	—Own	M—Swiss	Zenith	C—Own	S-4	Own	18
Ward La France, 3A	3,750	27.2	4¼x5¼		C & S	Simplex	P	—Own	S—	Zenith	P—Borg & Beck.	S-4	Brown-Lipe, 50..	19
Watson	3,950	32.4	4½x5½	Continental, E4.	C & S	Pierce	P	T—Rome-T'r'y	M—Simms	Stromberg	M—Brown-Lipe.	S-4	Brown-Lipe	20
White, 40	4,300	22.5	3¾x5¾	Own	C	Own	P	T—Own	M—	Own	P—Own	S-4	Own	21
White Hickory, M		32.4	4½x5½	Continental, E4.	C & S	Simplex	P	T—Chicago	M—Eisemann	Stromberg	M—	S-4	Fuller	22
Wichita, O	3,750	32.4	4½x5¾	Waukesha, N	C & S	Waukesha	P	C—Eng. & M	M—Berling	Stromberg	C—Hartford	S-4	Brown-Lipe, 50..	23
Wilcox, D		28.9	4¼x5	Own	S	Pierce	P	T—Own	M—Bosch	Stromberg	C—Own	S-4	Own	24
Wilson, G	3,800	32.4	4½x5½	Continental, E4.	C & S	Pierce	P	T—Own	M—Eisemann	Marvel	M—Warner	S-4	Covert	25
Winther, 979	4,100	32.4	4½x6	Wisconsin	C	N	P	T—Bremer	M—Eisemann	Master	P—Borg & Beck.	S-4	Brown-Lipe, 50..	26
W'nth'r-M'w'n, 479	4,900	28.8	4¼x6	Wisconsin, UAU.	C	N	P	T—Bremer	M—Eisemann	Master	P—Borg & Beck.	S-4	Brown-Lipe, 60..	27
8,000 Pounds:														
Gabriel, F	4,300	32.4	4½x6	Buda, YU	C	Duplex	P	T—G & O	M—Bosch	Rayfield	P—Borg & Beck.	S-4	Brown-Lipe, 60..	28
Kelly-Spr'gf'ld, K45	4,550	32.4	4½x6½	Own, K40	C	Own	P	C—Own	M—Eisemann	Rayfield	C—Own	S-3	Covert, K	29
Kimball, 8A		36.1	4¾x5½	Wisconsin		Simplex	P	C—Flexo	M—Eisemann	Master	M—Brown-Lipe.	S-4	Brown-Lipe	30
Moreland, 19G	4,875	36.1	4¾x6	Continental	C	Continental	P	C—Own	M—Dixie	Miller	M—Own	S-4	Own	31
Noble, MW4	3,750	32.4	4½x5½	Continental	C & S	Pierce	P	T—Chicago	M—Eisemann	Stromberg	P—Borg & Beck.	S-4	Fuller	32
Packard, 4E	4,550	32.4	4½x5½	Own	C	Own	P	T—Fedders	M—Dixie	Own	M—Own	S-4	Own	33
Parker	4,250	33.7	3¾x5¼	Continental, 6P.	C & S	Pierce	P	T—Bremer	M—Bosch	Stromberg	M—Brown-Lipe.	S-3	Own	34
Riker, BB	4,700	28.9	4¼x6	Own	C	Own	P	T—G & O	M—Berling	Own	C—Own	S-4	Own	35
Steele, BA	3,500	40.0	5 x5	Own		Own	P	C—	M—Eisemann	Stromberg	M—Hele-Shaw	I-3	Cotta	36
Union, C	3,500	28.0	4¼x6	Wisconsin, UAU.	C	Duplex	P	T—G & O	M—Eisemann	Schebler	M—Fuller	S-4	Fuller, GU	37
Winther, 89	4,200	28.8	4¼x6	Wisconsin, UAU.	C	Duplex	P	T—Bremer	M—Eisemann	Master	P—Borg & Beck.	S-4	Brown-Lipe, 60..	38
10,000 Pounds:														
Acason, M		36.1	4¾x6¾	Waukesha, PU7.	S	Waukesha	P	C—G & O	M—Eisemann	Stromberg	P—Borg & Beck.	S-3	Cotta, DU	39
Acme, E	4,850	36.1	4¾x6	Continental, B2.	C	Continental	P	T—G & O	M—Eisemann	Rayfield	P—Borg & Beck.	I-3	Cotta, EA	40
Atterbury, 8E	5,475	36.1	4¾x6	Continental, B2.	C	Continental	P	T—Long	M—Eisemann	Zenith	M—Brown-Lipe.	S-4	Brown-Lipe, 60..	41
Autohorse, 10	2,100	22.5	3¾x5	Continental, N	C & S	N	P	T—Eureka	M—Eisemann	Stromberg	P—Borg & Beck.	S-3	Detroit	42
Available, 5	4,900	32.4	4½x5½	Continental, E4.	C & S	Pierce	P	T—Chicago	M—Bosch	Stromberg	M—Brown-Lipe.	S-4	Brown-Lipe	43
A & B, 5T		42.8	5 x4¾	Own		N	P	T—Bush	M—Bosch	Schebler	M—	S-2		44
Brockway, T	5,000	36.1	4¾x6	Continental, B2.	C	Continental	P	T—Long	M—Eisemann	Schebler	M—Brown-Lipe.	S-4	Brown-Lipe, 60..	45
Clydesdale, 120B		36.1	4¾x6	Continental, B2.	C	Own	P	T—Own	M—Eisemann	Stromberg	M—Brown-Lipe.	S-4	Brown-Lipe, 60..	46
Corbitt, AA	5,000	36.1	4¾x6	Continental, B2.	C	Duplex	P	T—Rome-T'r'y	M—Eisemann	Stromberg	M—Hele-Shaw	S-3	Cotta	47
Couple-Gear	6,600	44.1	5¼x7	Wisconsin					M—Eisemann	Stromberg				48
Day-Elder, E	4,500	32.4	4½x6	Buda, YU	C & S	Monarch	P	T—Bush	M—Berling	Zenith	M—Brown-Lipe.	S-4	Brown-Lipe, 60..	49
Denby, 210	4,900	32.4	4½x5½	Continental, E7.	C & S	Duplex	P	T—Long	M—Eisemann	Stromberg	M—Own	S-4	Warner, AT53	50
Diamond T, R	5,190	32.4	4½x5½	Continental, E4.	C & S	Pierce	P	T—G & O	M—Bosch	Stromberg	M—Brown-Lipe.	S-4	Brown-Lipe, 60..	51
Diamond T, S	5,660	36.1	4¾x6	Class "B" Gov't	C & S	Pierce	P	T—G & O	M—Bosch	Stromberg	M—Brown-Lipe.	S-4	Brown-Lipe, 60..	52
Fageol	5,300	36.1	4¾x6¾						M—	Zenith	P—	S-3		53
Federal, X	4,400	32.4	4½x5½	Continental, E4.	C & S	Monarch	P	C—Own	M—Eisemann	Zenith	P—Borg & Beck.	S-4	Own	54
Garford, 68	5,000	36.4	4¾x5½	Wisconsin, AU	C & S	Simplex	P	T—Own	M—Eisemann	Rayfield	M—Brown-Lipe.	S-4	Own	55
GMC, 101	4,550	32.4	4½x5½	Continental, E4.	C & S	Monarch	P	T—Own	M—Eisemann	Marvel	M—Own	S-4	Own	56
Gramm-Berns'n, 55	5,500	36.2	4¾x6	Waukesha, P	C & S	Waukesha	P	T—Own	M—Eisemann	Stromberg	C—Own	I-4	Own	57
Hall	4,850	32.4	4½x5½	Continental, E4.	C & S	Duplex	P	T—Long	M—Eisemann	Zenith	M—Brown-Lipe.	S-4	Brown-Lipe	58
Hall	4,850	32.4	4½x5½	Continental, E4.	C & S	Duplex	P	T—Long	M—Eisemann	Zenith	M—Brown-Lipe.	S-4	Brown-Lipe	59
Harvey, WKA	5,000	32.4	4½x6	Buda	C	Duplex	P	T—Chicago	M—Eisemann	Stromberg	P—Borg & Beck.	S-4	Brown-Lipe	60
Hurlburt	4,350	32.5	4½x6	Buda, YU	C	Duplex	P	T—G & O	M—Eisemann	Flechter	M—Brown-Lipe.	S-3	Brown-Lipe, 3-50	61
Indiana, L	4,600	36.1	4¾x6¾	Waukesha, PU7.	S	Waukesha	P	T—Long	M—Eisemann	Stromberg	P—Borg & Beck.	S-4	Brown-Lipe, 60..	62
Kelly-Spr'gf'ld, K50	5,150	32.4	4½x6½	Own, K40	C	Own	P	T—Own	M—Eisemann	Rayfield	P—Own	S-3	Covert, F	63
Kimball, 10A		41.6	5.1x5½	Wisconsin		Simplex	P	C—Flexo	M—Eisemann	Master	M—Brown-Lipe.	S-4	Brown-Lipe	64
Kissel	4,785	29.0	4¼x5½	Own	C & S	Pierce	P	T—McCord	M—Eisemann	Stromberg	M—Warner	S-4	Warner	65
Kleiber, D	5,100	44.2	5½x5¾	Continental, T	C & S	Pierce	P	T—Rome-T'r'y	M—Bosch	Stromberg	M—Hele-Shaw	S-4	Brown-Lipe	66
Larrabee, T	4,750	32.4	4½x5½	Continental, E4.	C & S	Pierce	P	T—Bush	M—Bosch	Stromberg	M—Brown-Lipe.	S-4	Brown-Lipe, 60..	67
Master, B	4,990	36.1	4¾x6½	Buda, ATU	C	Pierce	P	T—Chicago	M—Eisemann	Master	M—Brown-Lipe.	S-4	Brown-Lipe	68
Menominee, J		36.1	4¾x5½	Wisconsin, A	C	Monarch	P	T—G & O	M—Eisemann	Stromberg	P—Borg & Beck.	I—	Cotta, DA	69
Moreland, 19J	5,350	36.1	4¾x6	Continental, B2.	C	Continental	P	C—Own	M—Dixie	Miller	M—Own	S-4	Own	70
Nelson & LeM'n, P5	4,750	36.2	4¾x6	Continental, B2.	C	Pierce	P	T—Chicago	M—Bosch	Stromberg	M—Brown-Lipe.	S-4	Brown-Lipe, 60..	71
Old Reliable, D	5,000	41.6	5.1x5½	Wisconsin, J	C	Monarch	P	T—Chicago	M—Bosch	Stromberg	M—Universal	S-4	Savage, SB60	72
Oneida, E-9	4,850	32.4	4½x5½	Own	C & S	Own	P	T—Modine	M—Bosch	Own	M—Own	I-4	Own	73
Packard, 5E	5,450	40.0	5 x5½	Own	C	Own	P	T—Fedders	M—Dixie	Own	M—Own	S-4	Own	74
Parker, M9	5,500	36.1	4¾x6	Continental, B2.	C	Continental	P	T—Bremer	M—Bosch	Stromberg	M—Brown-Lipe.	S-4	Warner	75
Pierce-Arrow, R9	5,500	38.3	4½x6	Own	C	Own	P	T—Own	M—	Own	C—Own	S-3	Own	76
Rowe, FW	4,900	40.0	4¾x5½	Wisconsin, AU	C	Simplex	P	C—Mavo	M—Bosch	Zenith	M—Brown-Lipe.	S-4	Brown-Lipe, 60..	77
Royal	5,000	36.1	4¾x5½	Wisconsin		Monarch	P	T—Kells	M—Bosch	Stromberg	M—Hele-Shaw	I-3	Own	78
Sandow, T	4,750	32.4	4½x5½	Continental, E4.	C & S	Monarch	P	T—Chicago	M—Bosch	Stromberg	M—Brown-Lipe.	S-4	Brown-Lipe	79
Sanford, 50	4,750	32.4	4½x5½	Continental, E4.	C & S	Pierce	P	T—McCord	M—Bosch	Stromberg	P—Borg & Beck.	S-4	Warner	80
Schacht	5,150	32.4	4½x6	Buda, YTU	C	Duplex	P	T—Bremer	M—Bosch	Schebler	C—Hartford	S-4	Own, C	81
Schleicher	4,725	36.1	4¾x6	Continental, B2.	C				M—Bosch	Stromberg	C—	S-4	Own	82
Schwartz	4,500	32.4	4½x6	Buda, YTU	C	Duplex	P	C—Fedders	M—Bosch	Stromberg	M—Brown-Lipe.	S-4	Brown-Lipe, 50..	83
Selden, CL		32.4	4½x5½	Continental, E7.	C & S	Pierce	P	T—Bush	M—Eisemann	Stromberg	M—Brown-Lipe.	S-4	Brown-Lipe, 60..	84
Service, 101	5,145	32.4	4½x6	Buda, YU	C	Simplex	P	T—Long	M—Eisemann	Stromberg	P—Borg & Beck.	S-4	Brown-Lipe, 60..	85
Signal, R	5,200	36.1	4¾x6	Continental, B2.	C	Continental	P	T—McCord	M—Eisemann	Stromberg	M—Brown-Lipe.	S-4	Brown-Lipe, 60..	86
Standard, 86	4,650	32.4	4½x5½	Continental, E7.	C & S	Monarch	P	T—McCord	M—Eisemann	Stromberg	M—Brown-Lipe.	S-4	Brown-Lipe, 60..	87
Steele, A	4,000	40.0	5 x5	Own		Own	P	C—	M—Eisemann	Stromberg	M—Hele-Shaw	I-3	Cotta	88
Sterling	5,600	40.0	5 x6¼	Own	C	Waukesha	P	C—Own	M—Eiseman	Rayfield	M—Hele-Shaw	I-6	Own	89

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TRUCK SPECIFICATIONS

7,000 (Service)—10,000 (Sterling)

Line number.	Final drive (Bevel-gear, Chain, External-gear, Internal-gear, Spur-and-bevel, Worm-gear).	Make of rear axle and model name or number.	Front springs (½, ¾, or Full elliptic; Tranverse).	Rear springs (Cantilever; ½, ¾, or Full elliptic; Transverse.	Make of springs.	Service brake (Contracting, Expanding).	Emergency brake (Contracting, Expanding).	Wheels (Iron, Steel, Wood) and make.	Number and location of driving-wheels (All-around, Front, Rear).	Make of steering-gear.	Frame material Pressed-steel, Rolled-steel, Wood)	Make of frame.	Wheel-base in inches.	Is self-starter furnished? (Yes or No.)	Front tire size in inches (Dual, Pneumatic)	Rear tire size in inches (Dual, Pneumatic)	Brand-name and model name or number.
																	7,000 Pds.—Con.
1	W	Timken, 6552	½	½	Mather	E	E	W—Bimel	2-R	Ross	P	Savage	171	N	36x5	36x5d	Service, 71
2	W	Timken, 6652	½	½	Mather	E	E	W—Bimel	2-R	Ross	P	Savage	171	N	36x5	36x5d	Service, 76
3	W	Timken, 6652	½	½	Perfection	E	E	W—Hayes	2-R	Ross	P	Savage	168	N	36x5	40x5d	Signal, M
4	W	Timken, 6652	½	½	Perfection	E	E	W—Hayes	2-R	Lavine	P	Savage	204	N	36x5	40x5d	Signal, ML
5	W	Timken	½	½	Detroit	E	E	W—Hayes	2-R	Gemmer	P	Detroit	160	N	36x5	36x5d	Standard, 66
6	W	Timken, 6652	½	½	Mather	E	E	W—Prudden	2-R	Ross	PW	Own	162	N	36x5	40x5d	Sterling
7	I	Clark, 3	½	½		C	C	S—Clark	2-R	Ross	P		165	N	36x5	36x5d	Stewart, I
8	W	Sheldon	½	½	Kalamazoo	E	E	W—Bimel	2-R	Ross	R	Own	160	N	36x5	36x5d	Tiffin, PW
9	I	Clark, 3	½	½	Sheldon			S—Dayton	2-R	Lavine	P		162	N	36x5	40x5d	Titan
10	W	Timken, 6652	½	½	Detroit	E	E	W—Prudden	2-R	Ross	P	Detroit	165	N	36x5	36x5d	Tower, G
11	I		½	½					4-A	Ross			140	N	36x6	36x6	Twin City
12	I	Clark, 3D	½	½	Detroit	E	C	S—	2-R	Lavine	P	Detroit	157	N	36x5	36x5d	United, C
13	C	Own	½	½	Kalamazoo	E	E	W—	2-R	Lavine	R		156	N	36x5	36x5d	Universal, L
14	C	Own	½	½	Tuthill	C	E	W—Schwarz	2-R	Lavine	R	Own	162	N	36x5	36x5d	U. S., D
15	W	Sheldon, W-30	½	½	Sheldon	E	E	W—Schwarz	2-R	Lavine	R	Own	162	N	36x5	40x5d	U. S., J
16	W	Timken	½	½	Mather	E	E	W—Prudden	2-R	Gemmer	P	Smith	174	N	36x5	36x5d	Velie, 26B
17	W	Timken	½	½					2-R	Gemmer			176		36x6	36x5d	Victor, M
18	E	Own	½	½		C	C	S—Own	4-A	Own	R	Own	108	N	40x4d	40x4d	Walter, MO3
19	W	Wisconsin	½	½				W—	2-R	Ross	P	Own	166	N	36x5	36x5d	Ward LaFrance, 3A
20	W	Timken, 6652	½	½	Sheldon	E	E	S—	2-R	Gemmer	P	Parish	156	N	36x5	36x10	Watson
21	I	Own	½	½		C	E	S—	2-R	Own	R		174	N	36x5	40x4d	White, 40
22	W	Timken	½	½		E	E	S—	2-R		P		156	N	36x5	36x10	White Hickory, M
23	W	Sheldon, W-30	½	½	Detroit	E	E	I—Smith	2-R	Ross	P	Own	165	N	36x5	36x5d	Wichita, O
24	W	Sheldon, W-30	½	½	Sheldon	E	E	I—Smith	2-R	Own	P	Own	154	N	36x5	36x5d	Wilcox, D
25	W	Timken, 6652	½	½	Perfection	E	E	W—Bimel	2-R	Ross	R	Lackawana	160	N	36x5	36x5d	Wilson, G
26	I	Clark, 3	½	½	Mather	C	E	S—Own	2-R	Ross	R	Own	150	N	38x7p	42x9p	Winther, 979
27	I	Clark, 3	½	½	Mather	C	E	S—Own	4-A	Ross	R	Own	158	N	36x5	36x5d	W'nth'r-M'w'n, 479
																	8,000 Pounds:
28	W	Timken, 6652	½	½	Merrill	E	E	I—Smith	2-R	Gemmer	P	Parish	180	N	36x5	40x5d	Gabriel, F
29	C	Own	½	½	Perfection	E	E	W—	2-R	Gemmer	P	Own	150	N	36x5	40x6d	Kelly-Spr'gf'd, K45
30	W	Sheldon	½	½				S—	2-R	Ross	P		164	N	36x6	40x6d	Kimball, 8A
31	W	Timken, 6652	½	½	U. S.	E	E	I—Smith	2-R	Ross	P	Smith	162	N	36x5	40x5d	Moreland, 19G
32	W	Sheldon	½	½	Kalamazoo	E	E	S—	2-R	Lavine	R		168	N	36x5	36x5d	Noble, MW4
33	W	Own	½	½		C	E		2-R		R	Own	156	N	36x5	40x5d	Packard, 4E
34	W	Own	½	½	Tuthill	E	E	W—Bimel	2-R	Ross	P	Own	168	N	36x5	40x6d	Parker
35	W	Own	½	½	Spring Perch	C	E	W—Jones	2-R	Ross	P	Parish	150	N	36x5	36x6d	Riker, BB
36	C	Own	½	½	Delaney			S—	2-R	Ross	R	Own	127	N	38x6	40x5d	Steele, BA
37	I	Torbensen, E	½	½	Mather	C	C	I—Smith	2-R	Ross	P	Smith	171	N	36x6	36x10	Union, C
38	I	Clark, 5	½	½	Mather	E	E	S—Own	2-R	Ross	R	Own	156	N	36x5	40x5d	Winther, 89
																	10,000 Pounds:
39	W	Timken, 6752	½	½	Detroit	E	E	I—Smith	2-R	Ross	P	Savage	187	N	36x6	40x6d	Acason, M
40	W	Timken, 6752	½	½	Detroit	E	E	I—Smith	2-R	Ross	P	Smith	180	N	36x6	40x6d	Acme, E
41	W	Timken, 6752	½	½	Spring Perch	E	E	S—Dayton	2-R	Gemmer	P	Savage	167½	N	36x5	40x6d	Atterbury, 8E
42	I	Own	½	½	Champion	C	E	W—	1-F	Own	R	Own		N	34x10		Autohorse, 10
43	W	Timken	½	½	Tuthill	E	E		2-R	Ross	R	Own		N			Available, 5
44	I	Own	½	½	Perfection	C	C	W—	2-R	Gemmer	R	Own	144	N	48x3½d	48x5d	A & B, 5T
45	W	Timken, 6752	½	½	Merrill	E	E	I—Smith	2-R	Gemmer	P	Parish	174	N	36x6	40x6d	Brockway, T
46	W	Timken, 6752	½	½	Standard	E	E	I—Smith	2-R	Ross	P	Parish & B.	204	N	36x6	40x6d	Clydesdale, 120B
47	W	Sheldon	½	½	Sheldon	E	E	S—	2-R	Ross	R		168	N	36x6	40x6d	Corbitt, AA
48	P	Own	½	½	Tuthill				4-A	Own			144	N	36x5d	36x5d	Couple-Gear
49	W	Sheldon, W50	½	½	Sheldon	E	E	W—Jones	2-R	Ross	P	Savage	150	N	36x5	40x6d	Day-Elder, E
50	I	Clark, 5	½	½	Detroit	E	E	S—Clark	2-R	Ross	P	Detroit	170	N	36x6	40x12	Denby, 210
51	W	Timken, 6752	½	½	Mather	E	E	W—Prudden	2-R	Gemmer	P	Smith	170	N	36x6	40x6d	Diamond T, R
52	W	Timken, 6752	½	½	Mather	E	E	I—Smith	2-R	Gemmer	P	Smith	180	N	36x6	40x6	Diamond T, S
53	W	Timken	½	½		E	E	W—	2-R		P		172	N	36x6	40x6d	Fageol
54	W	Timken, 6752	½	½	Mather	E	E	I—Smith	2-R	Gemmer	R		156	N	36x6	40x6d	Federal, X
55	C	Own	½	½	Perfection	E	E	I—Smith	2-R	Ross	P	Own	128	N	36x6	40x6d	Garford, 63
56	W	Timken, 6752	½	½	Detroit	E	E	I—Smith	2-R	Lavine	R	Own	163	N	36x6	40x6d	GMC, 101
57	W	Sheldon, W-50	½	½	Sheldon	E	E	I—Smith	2-R	Ross	P		168	N	36x6	40x6d	Gramm-Berns'n, 55
58	W	Timken	½	½	Detroit	E	E	I—Smith	2-R	Gemmer	R	Own		N	36x5	40x6	Hall
59	C		½	½	Perfection	E	E	I—Smith	2-R	Gemmer	R	Own		N	36x5	40x6	Hall
60	W	Sheldon	½	½	Sheldon	E	E	I—Smith	2-R	Ross	R	Own	160	N	36x6	40x6d	Harvey, WKA
61	W	Own	½	½	Merrill	E	E	W—Wayne	2-R	Ross	P	Parish	156	N	36x5	40x6d	Hurlburt
62	W	Sheldon, W-50	½	½		E	E	S—	2-R	Wohlrab	R	Own	167	N	36x5	40x6d	Indiana, L
63	C	Own	½	½	Perfection	E	E	W—	2-R	Gemmer	P	Own	150	N	36x6	40x6d	Kelly-Spr'gf'd, K50
64	W	Sheldon	½	½					2-R	Ross			164	N	36x6	40x6d	Kimball 10A
65	W	Sheldon	½	½	Sheldon	E	E	I—Smith	2-R	Ross	P	Smith	180	N	36x6	36x6d	Kissel
66	W	Timken	½	½	Betts	E	E	S—	2-R	Ross	R	Own	170	N	36x6	40x6d	Kleiber, D
67	W	Sheldon, W-50	½	½	Merrill	E	E	I—Smith	2-R	Ross	P	Savage	175	N	36x6	40x6d	Larrabee, T
68	W	Timken	½	½	Detroit	E	E	W—Prudden	2-R	Ross	P	Parish & B.	170	N	36x6	40x6d	Master, B
69	W	Timken, 6752	½	½	Tuthill	E	E	W—Standard	2-R	Ross	R	Own	160	N	36x6	40x6d	Menominee, J
70	W	Timken, 6752	½	½	U. S.	E	E	I—Smith	2-R	Ross	P	Smith	192	N	36x6	40x6d	Moreland, 19J
71	W	Timken, 6752	½	½	Tuthill	E	E	W—Prudden	2-R	Lavine	R	Own		N	36x6	40x6d	Nelson & LeM'n, P5
72	W	Sheldon, W50	½	½	Sheldon	E	E	W—St. Mary's	2-R	Ross	R	Own	168	N	36x6	40x6d	Old Reliable, D
73	W	Own	½	½	Mather	E	E	S—	2-R	Ross	P	Own	180	N	36x6	40x12	Oneida, E-9
74	W	Own	½	½		C	E		2-R		R	Own	156	N	36x6	40x6d	Packard, 5E
75	W	Timken	½	½	Tuthill	C	E	W—Bimel	2-R	Ross	P	Smith	160	Y	36x6	40x6d	Parker, M9
76	W	Own	½	½		C	E	W—Own	2-R	Own	P	Own	168	N	36x5	40x6d	Pierce-Arrow, R9
77	W	Sheldon, W-50	½	½	Sheldon	E	E		2-R	Ross	R	Own	171	N	36x6	40x6d	Rowe, FW
78	W	Timken	½	½	Merrill	E	E	W—	2-R	Ross	R	Own	168	N	36x6	40x6d	Royal
79	W	Timken	½	½	Garden City	E	E	W—Prudden	2-R	Ross	P	Savage	175	N	36x6	40x6d	Sandow, T
80	W	Sheldon	½	½	Perfection	E	E	W—	2-R	Ross	P	Parish	174	N	36x5	36x6d	Sanford, 50
81	W	Own	½	½	National	C	E	W—	2-R	Own	R	Own	168	N	36x5	40x6d	Schacht
82	C	Own	½	½					2-R				150	N	34x5	34x4d	Schleicher
83	I	Torbensen, E	½	½	Rowland	E	C	I—Smith	2-R	Ross	R	Parish	170	N	36x6	36x6d	Schwartz
84	W	Timken, 6752	½	½	Perfection	C	E	I—Smith	2-R	Ross	P	Parish & B.	170	N	36x6	40x12	Selden, CL
85	W	Timken, 6752	½	½		E	E	I—Smith	2-R	Ross	P	Savage	171½	N	36x6	40x6d	Service, 101
86	W	Timken, 6752	½	½	Perfection	E	E		2-R	Ross	P	Savage	216	N	36x6	40x6d	Signal, R
87	W	Timken	½	½	Detroit	E	E	W—Hayes	2-R	Gemmer	P	Detroit	160	N	36x6	40x6d	Standard, 86
88	C	Own	½	½	Delaney			S—	2-R	Ross	R	Own	127	N	36x6	40x6d	Steele, A
89	C	Own	½	½	Mather	E	C	I—Smith	2-R	Ross	PW	Own	174	N	36x6	40x6d	Sterling

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10,000 (Sterling)—15,000 INTERNAL-COMBUSTION

Brand-name and model name or number.	Price f. o. b factory with seat and tires but without body.	Horse-power rating by S. A. E. formula.	Bore and stroke of engine in inches	Make of engine and model name or number.	Lubrication (Circulating, Splash).	Make of governor (N indicates None).	Water-circulation (Pump, Thermo-siphon).	Radiator (Cellular, Tubular) and make.	Ignition system (Dry Cells, Magneto, Storage battery) and make of magneto.	Make of carbureter.	Clutch (Cone, Multiple-disk, Plate) and make.	Transmission (Individual-clutch, Planetary, Sliding-gear) and number of forward speeds.	Make of transmission and model name or number.	Line number.
10,000 Pds.—Con.														
Sterling	5,350	40.0	5 x6¼	Own	C	Waukesha	P	C—Own	M—Eisemann	Rayfield	M—Hele-Shaw	I-3	Own	1
Tiffin, RW	5,000	33.7	3¾x5¼	Continental, 6P	C & S	N	P	T—G & O	M—Bosch	Schebler	P—Borg & Beck	S-3	Fuller	2
Titan	5,150	32.4	4½x6	Buda, YU	C	Simplex	P	T—	M—Eisemann	Stromberg		I	Cotta	3
United, V		32.4	4½x6	Buda, YU	C	Simplex	P	T—G & O	M—Bosch	Stromber9	M—Brown-Lipe	S.4	Brown-Lipe, 60	4
U. S., K	4,850	36.1	4¾x6¾	Waukesha, P	C	Waukesha	P	T—Long	M—Eisemann	Stromberg	P—Borg & Beck	S-4	Brown-Lipe, 60	5
Vim, 24		28.9	4¼x5½	Hercules	C	Duplex	P	T—McCord	M—Dixie	Zenith	M—Brown-Lipe	S-4	Brown-Lipe	6
Walter, B5	5,000	30.6	4⅜x6	Own	C	Own	P	T—Own	M—Eisemann	Stromberg	C—Own	S-4	Own	7
White, 45	5,000	28.9	4¼x5¾	Own	C	Own	P	T—Own	M—	Own	P—Own	S-4	Own	8
Wilcox, W		36.0	4¾x6¾	Waukesha, P	S	Waukesha	P	T—Own	M—Bosch	Stromberg	C—Own	S-4	Own	9
Wilson, H	4,600	32.4	4½x5½	Continental, E4	C & S	Pierce	P	T—Own	M—Eisemann	Marvel	M—Warner	S-4	Warner, T53	10
Winther, 109	5,000	36.1	4¾x5½	Wisconsin, AU	C	Duplex	P	T—Bremer	M—Eisemann	Master	P—Borg & Beck	S-4	Brown-Lipe, 60	11
11,000 Pounds:														
Mack, AC	5,500	40.0	5 x6	Own	C & S	Own	P	T—Own	DM—Splitdorf	Zenith	P—Own	S-3	Own	12
12,000 Pounds:														
Doane	5,350	36.1	4¾x6¾	Waukesha, PU7	S	Waukesha	P	C—Own	M—Bosch	Master	M—Brown-Lipe	S-3		13
Garford, 69	5,300	41.5	5.1x5½	Wisconsin, JU	C & S	Simplex	P	T—Own	M—Eisemann	Rayfield	M—Brown-Lipe	S-4	Own	14
Kelly-Spr'gf'd, K60	5,500	32.4	4½x6½	Own, K40	C	Own	P	T—Own	M—Eisemann	Rayfield	T—Own	I-3	Covert, F	15
Packard, 6E	5,700	40.0	5 x5½	Own	C	Own	P	T—Fedders	M—Dixie	Own	M—Own	S-4	Own	16
Royal	5,400	42.2	5½x6	Wisconsin		Monarch	P	T—Kells	M—Bosch	Stromberg	M—Hele-Shaw	I-3	Own	17
Tiffin, SW	5,200	36.1	4¾x6	Continental, 6P	C & S	N	P	T—G & O	M—Bosch	Schebler	P—Borg & Beck	S-3	Covert	18
Winther, T		28.9	4¼x5½	Buda, HU	C	Simplex	P	T—G & O	M—Bosch	Stromberg	M—Brown-Lipe	S-4	Muncie, 63	19
Wichita, S	5,400	32.4	4½x6	Beaver, JAB	C & S	Duplex	P	C—Eng. & M	M—Bosch	Stromberg	C—Hartford	S-4	Own	20
Winther, 129	5,250	42.0	5½x6	Wisconsin, JAU	C	Duplex	P	T—Bremer	M—Eisemann	Master	P—Borg & Beck	S-4	Brown-Lipe, 60	21
14,000 Pounds:														
Old R'l'ble, K, L&M	6,000	36.1	4¾x6¾	Waukesha, P	C	Waukesha	P	T—Chicago	M—Bosch	Stromberg	M—Universal	S-4	Savage, 6495	22
Royal	6,500	44.2	5¼x7	Wisconsin		Monarch	P	T—Kells	M—Bosch	Stromberg	M—Hele-Shaw	I-3	Own	23
Winther, 149	5,500	42.0	5½x6	Wisconsin, JAU	C	Duplex	P	T—Bremer	M—Eisemann	Master	P—Borg & Beck	S-4	Brown-Lipe, 60	24
15,000 Pounds:														
Mack, AC	6,000	40.0	5 x6	Own	C & S	Own	P	T—Own	M—Splitdorf	Zenith	P—Own	S-3	Own	25
Sterling	6,000	40.0	5 x6¼	Own	C	Waukesha	P	C—Own	M—Eisemann	Rayfield	M—Hele-Shaw	I-6	Own	26

750—14,000 ELECTRIC TRUCK

Brand-name and model name or number.	Price f. o. b. factory with seat, tires and battery but without body.	Price f. o. b. factory with seat and tires but without battery and body.	Total horse-power of all motors at maximum overload.	Number and make of motors.	Battery (Lead-lead, Nickel-iron).	Number of cells in battery and number of plates in each cell.	Mileage on one charge with capacity load (at maximum speed).	Mileage on one charge unloaded (at maximum speed).	Make of battery and model name or number.	Number of forward and reverse speeds.	Make of controller.	Line number.
750 Pounds:												
Ward, WS				1—Westinghouse	L or N	42–65			Optional	4–2	Westi'gh'se	1
1,000 Pounds:												
C. T	$2,270	$1,800		2—G. E	L or N	42-60, L-13	55	65	Optional	4–2	Own	2
Lansden				1—G. E	L or N		60		Optional	4–2	G. E	3
Walker, M		1,850		1—Westinghouse	L or N	44-66	40-60		Optional	5–5	Westi'gh'se	4
1,250 Pounds:												
Ward, WA				1—G. E	L or N	42-60			Optional	4–2	G. E	5
2,000 Pounds:												
Atlantic, 1C				1—G. E	L or N				Optional	4–.	G. E	6
C. T	2,735	2,150		2—G. E	L or N	42-60, L-17	55	65	Optional	4–2	Own	7
Lansden				1—G. E	L or N	44-60	60		Optional	4–2	G. E	8
Walker, K		2,300		1—Westinghouse	L or N	44-60	40–60		Optional	5–5	Westi'gh'se	9
Ward, WB				1—G. E	L or N	42–60			Optional	4–2	G. E	10
4,000 Pounds:												
Atlantic, 2C				1—G. E	L or N				Optional	4–.	G. E	11
C. T	3,260	2,550		2—G. E	L or N	42-60, L-21	50	60	Optional	4–2	Own	12
Lansden				1—G. E	L or N	44-60	50		Optional	4–2	G. E	13
Oneida, 2E		2,600		—Own	L or N		40–60		Optional	5–5	Own	14
Walker, L		2,600		1—Westinghouse	L or N	44-60	40–60		Optional	5–5	Westi'gh'se	15
Ward, WD				1—G. E	L or N	42–60			Optional	4–2	G. E	16
7,000 Pounds:												
Atlantic, 3C				1—G. E	L or N				Optional	5–.	G. E	17
Couple-Gear, H				4—Own		44, 23	20	30	Philadelphia	5–5		18
C. T	3,920	3,050		2—G. E	L or N	42-60, L-27	45	55	Optional	4–2	Own	19
C. T	4,570	3,700		4—G. E	L or N	42-60, L-27	45	55	Optional	4–2	Own	20
Lansden				1—G. E	L or N	44-60	50		Optional	4–2	G. E	21
Walker, P		3,500		1—Westinghouse	L or N	44-60	40–50		Optional	5–5	Westi'gh'se	22
Ward, WF				1—G. E	L or N	42–60			Optional	4–2	G. E	23
10,000 Pounds:												
Atlantic, 5C				1—G. E	L or N				Optional	5–.	G. E	24
Couple-Gear, A				4—Own		44, 27	20	30	Philadelphia	5–5		25
C. T	5,200	4,200		4—G. E	L or N	42-60, L-31	45	55	Optional	4–2	Own	26
Lansden				1—G. E	L or N	44-60	50		Optional	4–2	G. E	27
Walker, N		3,800		1—Westinghouse	L or N	44-60	40–50		Optional	5–5	Westi'gh'se	28
Ward, WH				1—G. E	L or N	42–60			Optional	4–2	G. E	29
12,000 Pounds:												
Atlantic, 6C				1—G. E	L or N				Optional	5–.	G. E	30
Lansden				1—G. E	L or N		45		Optional	4–2	G. E	31
14,000 Pounds:												
Couple-Gear, LD				4—Own		44, 29	20	30	Philadelphia	5–5		32

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TRUCK SPECIFICATIONS — 10,000 (Sterling)—15,000

Line number.	Final drive (Bevel-gear, Chain, External-gear, Internal-gear, Spur-and-bevel, Worm-gear).	Make of rear axle and model name or number.	Front springs (½, ¾, or Full elliptic; Tranverse).	Rear springs (Cantilever; ½, ¾, or Full elliptic; Transverse.	Make of springs.	Service brake (Contracting, Expanding).	Emergency brake (Contracting, Expanding).	Wheels (Iron, Steel, Wood) and make.	Number and location of driving - wheels (All-around, Front, Rear).	Make o steering-gear.	Frame material Pressed-steel, Rolled-steel, Wood)	Make of frame.	Wheel-base in inches.	Is self-starter furnished? (Yes or No.)	Front tire size in inches (Dual, Pneumatic)	Rear tire size in inches (Dual, Pneumatic)	Brand-name and model name or number.
																	10,000 Pds.—Con.
1	W	Timken, 6752	½	½	Mather	E	E	W—Prudden	2-R	Ross	PW	Own	168	N	36x6	40x6d	Sterling
2	W	Sheldon	½	½	Kalamazoo	E	E	S—	2-R	Ross	R	Own	168	N	36x6	40x6d	Tiffin, RW
3	I	Clark, 5	½	½	Sheldon		C	S—Clark	2-R	Lavine	P		156	N	36x5	40x6d	Titan
4	I	Clark, 5D	½	½	Detroit	E	E	S—	2-R	Ross	P	Detroit	160	N	36x5	40x6d	United, V
5	W	Sheldon, W-50	½	½	Sheldon	E	E	S—Dayton	2-R	Lavine	R	Own	168	N	36x5	40x6d	U. S., K
6	W	Sheldon	½	½	Sheldon	E	E	l—Smith	2-R	Gemmer	P	Own	150	N	36x6	40x5d	Vim, 24
7	I	Own	½	½	Merrill	C	E	S—Own	2-R	Ross	P	Own	156	N	36x6	40x6d	Walter, B5
8	I	Own	½	½		C	E	S—	2-R	Own	R		174	N	36x6	40x6d	White, 45
9	W	Sheldon, W50	½	½	Sheldon	E	E	I—Smith	2-R	Own	R	Own	162	N	36x5	40x6d	Wilcox, W
10	W	Timken, 6752	½	½	Perfection	E	E	W—Bimel	2-R	Ross	R	Lackwanna	160	N	36x6	40x6d	Wilson, H
11	I	Clark, 5	½	½	Mather	E	E	S—Own	2-R	Ross	R	Own	162	N	36x5	40x6d	Winther, 109
																	11,000 Pounds:
12	C	Own	½	½	Merrill	C	E	W—Schwarz	2-R	Gemmer	P	Own	Opt'nal	N	36x6	40x6d	Mack, AC
																	12,000 Pounds:
13	C	Own	½	½			E	S—West	2-R	Lavine	R		178	N	36x6	40x6d	Doane
14	C	Own	½	½	Perfection	C	E	I—Smith	2-R	Ross	P	Own	128	N	36x6	40x7d	Garford, 69
15	C	Own	½	½	Perfection	C	E	W—	2-R	Gemmer	P	Own	150	N	36x6	40x7d	Kelly-Spr'gf'd, K60
16	W	Own	½	½		C	E		2-R		R	Own	156	N	36x6	40x7d	Packard, 6E
17	W	Timken	½	½	Merrill	E	E	W—	2-R	Ross	R	Own	168	N	36x6	40x6d	Royal
18	W	Sheldon	½	½	Kalamazoo	E	E	S—	2-R	Ross	R	Own	168	N	36x6	40x12	Tiffin, SW
19	I	Torbensen, C	½	C	Detroit	E	C	S—	2-R	Jacox	R	Detroit		N	34x3½	34x7	United, T
20	B	Own	½	½	Detroit	E	E	I—Smith	2-R	Ross	P	Savage	165	N	38x6	40x6d	Wichita, S
21	I	Clark, 5	½	½	Mather	E	E	S—Own	2-R	Ross	R	Own	162	N	36x6	40x12	Winther, 129
																	14,000 Pounds:
22	C	Sheldon, RA70	½	C	Sheldon	C	E	S—	2-R	Ross	R	Own	136	N	36x6	40x7d	Old R'l'ble, K, L&M
23	W	Timken	½	½	Merrill	E	E	W—	2-R	Ross	R	Own	168	N	36x7	40x7d	Royal
24	I	Clark, 5	½	½	Mather	E	E	S—Own	2-R	Ross	R	Own	162	N	36x6	40x7d	Winther, 149
																	15,000 Pounds:
25	C	Own	½	½	Merrill	C	E	W—Schwarz	2-R	Gemmer	P	Own	Opt'nal	N	36x7	40x7d	Mack, AC
26	C	Own	½	½	Mather	E	C	I—Smith	2-R	Ross	PW	Own	174	N	36x6	40x7d	Sterling

SPECIFICATIONS — 750—14,000

Line number.	Primary drive (Bevel-gear, Chain, Spur-gear, Worm-gear).	Final drive (Bevel-gear, Chain, Spur-gear, Worm-gear).	Make of rear axle and model name or number	Front springs (½, ¾ elliptic).	Rear springs (½, ¾ elliptic).	Make of springs.	Service brake (Contracting, Expanding).	Emergency brake (Contracting, Expanding).	Wheels (Iron, Steel, Wood) and make.	Number and location of driving - wheels (All-around, Front, Rear).	Make of steering-gear.	Frame material (Pressed-steel, Rolled-steel).	Make of frame.	Wheel-base in inches.	Front tire size in inches (Dual, Pneumatic).	Rear tire size in inches (Dual, Pneumatic).	Brand-name and model name or number.
																	750 Pounds:
1	.....	B	Timken	½	½	Sheldon	C	C	W—Schwarz	2-R	Own	R	Own	88	32x2½	32x3	Ward, WS
																	1,000 Pounds:
2	S	S	Own	¾	½	Sheldon	E	Elect.	W—	2-R		R	Own	90	36x3	36x3	C. T
3	B	C	Own	½	½	Own	E	C	W—Jones	2-R	Own	P	Own				Lansden
4	N	S	Own	½	½	Mather	C	E	S—Own	2-R	Ross	PorR	Own	93	34x3	36x3½	Walker, M
																	1,250 Pounds:
5	.....	W	Sheldon	.....	.....		E	E	W—	2-R	Own	R	Own	90	32x3	32x3½	Ward, WA
																	2,000 Pounds:
6	.....	C	Timken	½	½					2-R	Ross			103	34x4	36x4	Atlantic, 1C
7	S	S	Own	½	½	Sheldon	E	Elect.	W—	2-R		R	Own	101	36x3½	36x4	C. T
8	B	C	Own	½	½	Own	E	C	W—Jones	2-R	Own	P	Own	166	36x3	36x3½	Lansden
9	N	S	Own	½	½	Mather	C	E	S—Own	2-R	Ross	PorR	Own	96	34x3½	36x4	Walker, K
10	.....	W	Sheldon	½	½	Sheldon	E	E	W—Schwarz	2-R	Own	R	Own	102	32x3½	36x4	Ward, WB
																	4,000 Pounds:
11	.....	C	Timken	½	½					2-R	Ross			115	34x4	36x3d	Atlantic, 2C
12	S	S	Own	½	½	Sheldon	E	Elect.	W—	2-R		R	Own	116	36x4	36x4d	C. T
13	B	S	Own	½	½	Own	E	C	W—Jones	2-R	Own	P	Own	120	36x4	36x3d	Lansden
14	S	S	Own	½	½	Mather			W—	2-R	Own	P	Own	111	36x4	36x6	Oneida, 2E
15	N	S	Own	½	½	Mather	C	E	S—Own	2-R	Ross	PorR	Own	112	36x4	38x6	Walker, L
16	.....	W	Sheldon	½	½	Sheldon	E	E	W—Schwarz	2-R	Own	R	Own	114	36x4	36x6	Ward, WD
																	7,000 Pounds:
17	.....	C	Timken	½	½					2-R	Ross			135	36x5	40x4d	Atlantic, 3C
18	B	B		½	½				—Own	4-A	Own			96	36x4d	36x4d	Couple-Gear, H
19	S	S	Own	½	½	Sheldon	C	Elect.	W—	2-R		R	Own	126	36x5	36x5d	C. T
20	S	S	Own	½	½	Sheldon	C	Elect.	W—	4-A		R	Own	122	36x3½d	36x4d	C. T
21	B	C	Own	½	½	Own	E	C	W—Jones	2-R	Own	P	Own	130	36x5	36x4d	Lansden
22	N	S	Own	½	½	Mather	C	E	S—Own	2-R	Ross	Por R	Own	131	36x5	38x5d	Walker, P
23	.....	W	Sheldon	½	½	Sheldon	E	E	W—Schwarz	2-R	Own	R	Own	132	36x5	36x8	Ward, WF
																	10,000 Pounds:
24	.....	C	Timken	½	½					2-R	Ross			144	36x6	40x5d	Atlantic, 5C
25	B	B		½	½				—Own	4-A	Own			96	36x5d	36x5d	Couple-Gear, A
26	S	S	Own	½	½	Sheldon	C	Elect.	W—	4-A		R	Own	132	36x4d	36x5d	C. T
27	S	C	Own	½	½	Own	E	C	W—Jones	2-R	Own	P	Own	142	36x6	36x5d	Lansden
28	N	S	Own	½	½	Mather	C	E	S—Own	2-R	Ross	PorR	Own	141	36x6	38x6d	Walker, N
29	.....	W	Sheldon	½	½	Sheldon	E	E	W—Schwarz	2-R	Own	R	Own	144	36x6	38x10	Ward, WH
																	12,000 Pounds:
30	.....	C	Timken	½	½					2-R	Ross			156	36x6	40x6d	Atlantic, 6C
31	B	C	Own	½	½	Own	E	C	W—Jones	2-R	Own	P	Own				Lansden
																	14,000 Pounds:
32	B	B		½	½				—Own	4-A	Own			96	36x5d	36x6d	Couple-Gear, LD

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10,000 (Sterling)—15,000 INTERNAL-COMBUSTION

Brand-name and model name or number.	Price f. o. b. factory with seat and tires but without body.	Horse-power rating by S. A. E. formula.	Bore and stroke of engine in inches	Make of engine and model name or number.	Lubrication (Circulating, Splash).	Make of governor (N indicates None).	Water-circulation (Pump, Thermo-siphon).	Radiator (Cellular, Tubular) and make.	Ignition system (Dry Cells, Magneto, Storage battery) and make of magneto.	Make of carbureter.	Clutch (Cone, Multiple-disk, Plate) and make.	Transmission (Individual-clutch, Planetary, Sliding-gear) and number of forward speeds.	Make of transmission and model name or number.	Line number.
10,000 Pds.—Con.														
Sterling	5,350	40.0	5 x6¼	Own	C	Waukesha..	P	C—Own	M—Eisemann.	Rayfield...	M—Hele-Shaw..	I-3	Own	1
Tiffin, RW	5,000	33.7	3¾x5¼	Continental, 6P.	C & S	N	P	T—G & O	M—Bosch	Schebler...	P—Borg & Beck.	S-3	Fuller	2
Titan	5,150	32.4	4½x6	Buda, YU	C	Simplex	P	T—	M—Eisemann.	Stromberg.		I	Cotta	3
United, V		32.4	4½x6	Buda, YU	C	Simplex	P	T—G & O	M—Bosch	Stromber9..	M—Brown-Lipe.	S.4	Brown-Lipe, 60..	4
U. S., K	4,850	36.1	4¾x6¾	Waukesha, P.	C	Waukesha.	P	T—Long	M—Eisemann.	Stromberg.	P—Borg & Beck.	S-4	Brown-Lipe, 60..	5
Vim, 24		28.9	4¼x5½	Hercules	C	Duplex	P	T—McCord	M—Dixie	Zenith	M—Brown-Lipe.	S-4	Brown-Lipe	6
Walter, B5	5,000	30.6	4⅜x6	Own	C	Own	P	T—Own	M—Eisemann.	Stromberg.	C—Own	S-4	Own	7
White, 45	5,000	28.9	4½x5¾	Own	C	Own	P	T—Own	M—	Own	P—Own	S-4	Own	8
Wilcox, W		36.0	4¾x6¾	Waukesha, P.	S	Waukesha..	P	T—Own	M—Bosch	Stromberg.	C—Own	S-4	Own	9
Wilson, H	4,600	32.4	4½x5½	Continental, E4	C & S	Pierce	P	T—Own	M—Eisemann.	Marvel	M—Warner	S-4	Warner, T53	10
Winther, 109	5,000	36.1	4¾x5½	Wisconsin, AU..	C	Duplex	P	T—Bremer	M—Eisemann.	Master	P—Borg & Beck.	S-4	Brown-Lipe, 60..	11
11,000 Pounds:														
Mack, AC	5,500	40.0	5 x6	Own	C & S	Own	P	T—Own	DM—Splitdorf	Zenith	P—Own	S-3	Own	12
12,000 Pounds:														
Doane	5,350	36.1	4¾x6¾	Waukesha, PU7.	S	Waukesha..	P	C—Own	M—Bosch	Master	M—Brown-Lipe.	S-3		13
Garford, 69	5,300	41.5	5.1x5½	Wisconsin, JU.	C & S	Simplex	P	T—Own	M—Eisemann.	Rayfield	M—Brown-Lipe.	S-4	Own	14
Kelly-Spr'gf'd, K60	5,500	32.4	4½x6½	Own, K40	C	Own	P	T—Own	M—Eisemann.	Rayfield...	T—Own	I-3	Covert, F	15
Packard, 6E	5,700	40.0	5 x5½	Own	C	Own	P	T—Fedders	M—Dixie	Own	M—Own	S-4	Own	16
Royal	5,400	42.2	5⅛x6	Wisconsin		Monarch	P	T—Kells	M—Bosch	Stromberg.	M—Hele-Shaw..	I-3	Own	17
Tiffin, SW	5,200	36.1	4¾x6	Continental, 6P.	C & S	N	P	T—G & O	M—Bosch	Schebler...	P—Borg & Beck.	S-3	Covert	18
United, T		28.9	4¼x5½	Buda, HU	C	Simplex	P	T—G & O	M—Bosch	Stromberg.	M—Brown-Lipe.	S-4	Muncie, 63	19
Wichita, S	5,400	32.4	4½x6	Beaver, JAB	C & S	Duplex	P	C—Eng. & M..	M—Bosch	Stromberg.	C—Hartford	S-4	Own	20
Winther, 129	5,250	42.0	5⅛x6	Wisconsin, JAU.	C	Duplex	P	T—Bremer	M—Eisemann.	Master	P—Borg & Beck.	S-4	Brown-Lipe, 60..	21
14,000 Pounds:														
Old R'l'ble, K, L&M	6,000	36.1	4¾x6¾	Waukesha, P.	C	Waukesha..	P	T—Chicago	M—Bosch	Stromberg.	M—Universal	S-4	Savage, 6495	22
Royal	6,500	44.2	5¼x7	Wisconsin		Monarch	P	T—Kells	M—Bosch	Stromberg.	M—Hele-Shaw..	I-3	Own	23
Winther, 149	5,500	42.0	5⅛x6	Wisconsin, JAU.	C	Duplex	P	T—Bremer	M—Eisemann.	Master	P—Borg & Beck.	S-4	Brown-Lipe, 60..	24
15,000 Pounds:														
Mack, AC	6,000	40.0	5 x6	Own	C & S	Own	P	T—Own	M—Splitdorf..	Zenith	P—Own	S-3	Own	25
Sterling	6,000	40.0	5 x6¼	Own	C	Waukesha.	P	C—Own	M—Eisemann.	Rayfield...	M—Hele-Shaw..	I-6	Own	26

750—14,000 ELECTRIC TRUCK

Brand-name and model name or number.	Price f. o. b. factory with seat, tires and battery but without body.	Price f. o. b. factory with seat and tires but without battery and body.	Total horse-power of all motors at maximum overload.	Number and make of motors.	Battery (Lead-lead, Nickel-iron).	Number of cells in battery and number of plates in each cell.	Mileage on one charge with capacity load (at maximum speed).	Mileage on one charge unloaded (at maximum speed).	Make of battery and model name or number.	Number of forward and reverse speeds.	Make of controller.	Line number.
750 Pounds:												
Ward, WS				1—Westinghouse	L or N	42-65			Optional	4-2	Westi'gh'se	1
1,000 Pounds:												
C. T	$2,270	$1,800		2—G. E	L or N	42-60, L-13	55	65	Optional	4-2	Own	2
Lansden				1—G. E	L or N		60		Optional	4-2	G. E	3
Walker, M		1,850		1—Westinghouse	L or N	44-66	40-60		Optional	5-5	Westi'gh'se	4
1,250 Pounds:												
Ward, WA				1—G. E	L or N	42-60			Optional	4-2	G. E	5
2,000 Pounds:												
Atlantic, 1C				1—G. E	L or N				Optional	4-.	G. E	6
C. T	2,735	2,150		2—G. E	L or N	42-60, L-17	55	65	Optional	4-2	Own	7
Lansden				1—G. E	L or N	44-60	60		Optional	4-2	G. E	8
Walker, K		2,300		1—Westinghouse	L or N	44-60	40-60		Optional	5-5	Westi'gh'se	9
Ward, WB				1—G. E	L or N	42-60			Optional	4-2	G. E	10
4,000 Pounds:												
Atlantic, 2C				1—G. E	L or N				Optional	4-.	G. E	11
C. T	3,260	2,550		2—G. E	L or N	42-60, L-21	50	60	Optional	4-2	Own	12
Lansden				1—G. E	L or N	44-60	50		Optional	4-2	G. E	13
Oneida, 2E		2,600		—Own	L or N		40-60		Optional	5-5	Own	14
Walker, L		2,600		1—Westinghouse	L or N	44-60	40-60		Optional	5-5	Westi'gh'se	15
Ward, WD				1—G. E	L or N	42-60			Optional	4-2	G. E	16
7,000 Pounds:												
Atlantic, 3C				1—G. E	L or N				Optional	5-.	G. E	17
Couple-Gear, H				4—Own		44, 23	20	30	Philadelphia	5-5		18
C. T	3,920	3,050		2—G. E	L or N	42-60, L-27	45	55	Optional	4-2	Own	19
C. T	4,570	3,700		4—G. E	L or N	42-60, L-27	45	55	Optional	4-2	Own	20
Lansden				1—G. E	L or N	44-60	50		Optional	4-2	G. E	21
Walker, P		3,500		1—Westinghouse	L or N	44-60	40-50		Optional	5-5	Westi'gh'se	22
Ward, WF				1—G. E	L or N	42-60			Optional	4-2	G. E	23
10,000 Pounds:												
Atlantic, 5C				1—G. E	L or N				Optional	5-.	G. E	24
Couple-Gear, A				4—Own		44, 27	20	30	Philadelphia	5-5		25
C. T	5,200	4,200		4—G. E	L or N	42-60, L-31	45	55	Optional	4-2	Own	26
Lansden				1—G. E	L or N	44-60	50		Optional	4-2	G. E	27
Walker, N		3,800		1—Westinghouse	L or N	44-60	40-50		Optional	5-5	Westi'gh'se	28
Ward, WH				1—G. E	L or N	42-60			Optional	4-2	G. E	29
12,000 Pounds:												
Atlantic, 6C				1—G. E	L or N				Optional	5-.	G. E	30
Lansden				1—G. E	L or N		45		Optional	4-2	G. E	31
14,000 Pounds:												
Couple-Gear, LD				4—Own		44, 29	20	30	Philadelphia	5-5		32

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TRUCK SPECIFICATIONS — 10,000 (Sterling)—15,000

Line number.	Final drive (Bevel-gear, Chain, External-gear, Internal-gear, Spur-and-bevel, Worm-gear).	Make of rear axle and model name or number.	Front springs (½, ¾, or Full elliptic; Tranverse).	Rear springs (Cantilever; ½, ¾, or Full elliptic; Transverse.	Make of springs.	Service brake (Contracting, Expanding).	Emergency brake (Contracting, Expanding).	Wheels (Iron, Steel, Wood) and make.	Number and location of driving-wheels (All-around, Front, Rear).	Make o steering-gear.	Frame material Pressed-steel, Rolled-steel, Wood)	Make of frame.	Wheel-base in inches.	Is self-starter furnished? (Yes or No.)	Front tire size in inches (Dual, Pneumatic)	Rear tire size in inches (Dual, Pneumatic)	Brand-name and model name or number.
																	10,000 Pds.—Con.
1	W	Timken, 6752.....	½	½	Mather.....	E	E	W—Prudden..	2-R	Ross.....	PW	Own.....	168	N	36x6	40x6d	Sterling
2	W	Sheldon.....	½	½	Kalamazoo...	E	E	S—.....	2-R	Ross.....	R	Own.....	168	N	36x6	40x6d	Tiffin, RW
3	I	Clark, 5.....	½	½	Sheldon.....	...	...	S—Clark	2-R	Lavine.....	P	.....	156	N	36x5	40x6d	Titan
4	I	Clark, 5D.....	½	½	Detroit.....	E	C	S—.....	2-R	Ross.....	P	Detroit....	160	N	36x5	40x6d	United, V
5	W	Sheldon, W-50....	½	½	Sheldon.....	E	E	S—Dayton....	2-R	Lavine.....	R	Own.....	168	N	36x5	40x6d	U. S., K
6	W	Sheldon.....	½	½	Sheldon.....	E	E	1—Smith	2-R	Gemmer	P	Own.....	150	N	36x6	40x5d	Vim, 24
7	I	Own.....	½	½	Merrill.....	C	E	S—Own.....	2-R	Ross	P	Own.....	156	N	36x6	40x6d	Walter, B5
8	I	Own.....	½	½	.....	C	E	S—.....	2-R	Own.....	R	.....	174	N	36x6	40x6d	White, 45
9	W	Sheldon, W50.....	½	½	Sheldon.....	E	E	I—Smith.....	2-R	Own.....	E	Own.....	162	N	36x5	40x6d	Wilcox, W
10	W	Timken, 6752.....	½	½	Perfection...	E	E	W—Bimel.....	2-R	Ross.....	R	Lackwanna	160	N	36x6	40x6d	Wilson, H
11	I	Clark, 5.....	½	½	Mather	E	E	S—Own.....	2-R	Ross.....	R	Own.....	162	N	36x5	40x6d	Winther, 109
																	11,000 Pounds:
12	C	Own.....	½	½	Merrill	C	E	W—Schwarz ..	2-R	Gemmer.....	P	Own.....	Opt'nal	N	36x6	40x6d	Mack, AC
																	12,000 Pounds:
13	C	Own.....	½	½	.....	...	E	S—West.....	2-R	Lavine.....	R	.....	178	N	36x6	40x6d	Doane
14	C	Own.....	½	½	Perfection...	C	E	I—Smith.....	2-R	Ross.....	P	Own.....	128	N	36x6	40x7d	Garford, 69
15	C	Own.....	½	½	Perfection...	E	E	W—.....	2-R	Gemmer.....	P	Own.....	150	N	36x6	40x7d	Kelly-Spr'gf'd, K60
16	W	Own.....	½	½	.....	C	E	.....	2-R	.....	R	Own.....	156	N	36x6	40x7d	Packard, 6E
17	W	Timken.....	½	½	Merrill.....	E	E	W—.....	2-R	Ross.....	R	Own.....	168	N	36x6	40x6d	Royal
18	W	Sheldon.....	½	½	Kalamazoo..	E	E	S—.....	2-R	Ross.....	R	Own.....	168	N	36x6	40x12	Tiffin, SW
19	I	Torbensen, C.....	½	C	Detroit.....	E	C	S—.....	2-R	Jacox.....	R	Detroit.....	.....	N	34x3½	34x7	United, T
20	B	Own.....	½	½	Detroit.....	E	E	I—Smith	2-R	Ross.....	P	Savage....	165	N	38x6	40x6d	Wichita, S
21	I	Clark, 5.....	½	½	Mather.....	E	E	S—Own.....	2-R	Ross.....	R	Own.....	162	N	36x6	40x12	Winther, 129
																	14,000 Pounds:
22	C	Sheldon, RA70	½	C	Sheldon.....	C	E	S—.....	2-R	Ross.....	R	Own.....	136	N	36x6	40x7d	Old R'l'ble, K, L&M
23	W	Timken.....	½	½	Merrill.....	E	E	W—.....	2-R	Ross.....	R	Own.....	168	N	36x7	40x7d	Royal
24	I	Clark, 5.....	½	½	Mather.....	E	E	S—Own.....	2-R	Ross.....	R	Own.....	162	N	36x6	40x7d	Winther, 149
																	15,000 Pounds:
25	C	Own.....	½	½	Merrill	C	E	W—Schwarz ..	2-R	Gemmer.....	P	Own.....	Opt'nal	N	36x7	40x7d	Mack, AC
26	C	Own.....	½	½	Mather.....	E	C	I—Smith	2-R	Ross.....	PW	Own.....	174	N	36x6	40x7d	Sterling

SPECIFICATIONS — 750—14,000

Line number.	Primary drive (Bevel-gear, Chain, None, Spur-gear, Worm-gear).	Final drive (Bevel-gear, Chain, Spur-gear, Worm-gear).	Make of rear axle and model name or number	Front springs (½, ¾ elliptic).	Rear springs (½, ¾ elliptic).	Make of springs.	Service brake (Contracting, Expanding).	Emergency brake (Contracting, Expanding).	Wheels (Iron, Steel, Wood) and make.	Number and location of driving-wheels (All-around, Front, Rear).	Make of steering-gear.	Frame material (Pressed-steel, Rolled-steel).	Make of frame.	Wheel-base in inches.	Front tire size in inches (Dual, Pneumatic).	Rear tire size in inches (Dual, Pneumatic).	Brand-name and model name or number.
																	750 Pounds:
1	.....	B	Timken...	½	½	Sheldon.....	C	C	W—Schwarz.....	2-R	Own...	R	Own.....	88	32x2½	32x3	Ward, WS.....
																	1,000 Pounds:
2	S	S	Own.....	¾	½	Sheldon.....	E	Elect.	W—.....	2-R	.....	R	Own.....	90	36x3	36x3	C. T.....
3	B	C S	Own.....	½	½	Own.....	E C	C	W—Jones.....	2-R	Own...	P	Own.....	...	.....	.....	Lansden.....
4	N	S	Own.....	½	½	Mather.....	C	E	S—Own.....	2-R	Ross ..	PorR	Own.....	93	34x3	36x3½	Walker, M.....
																	1,250 Pounds:
5	.....	W	Sheldon..	.....	.....	.....	E	E	W—.....	2-R	Own...	R	Own.....	90	32x3	32x3½	Ward, WA.....
																	2,000 Pounds:
6	.....	C	Timken..	½	½	.....	...	...	.....	2-R	Ross...	.....	.....	103	34x4	36x4	Atlantic, 1C.....
7	S	C S C S	Own.....	½	½	Sheldon.....	E	Elect.	W—.....	2-R	.....	R	Own.....	101	36x3½	36x4	C. T.....
8	B	C S	Own.....	½	½	Own.....	E C	C	W—Jones.....	2-R	Own...	P	Own.....	166	36x3	36x3½	Lansden.....
9	N	C S	Own.....	½	½	Mather.....	E C	E	S—Own.....	2-R	Ross...	PorR	Own.....	96	34x3½	36x4	Walker, K.....
10	.....	W	Sheldon..	½	½	Sheldon.....	E	E	W—Schwarz.....	2-R	Own...	R	Own.....	102	32x3½	36x4	Ward, WB.....
																	4,000 Pounds:
11	.....	C S	Timken..	½	½	.....	...	...	.....	2-R	Ross...	.....	.....	115	34x4	36x3d	Atlantic, 2C.....
12	S	C S	Own.....	½	½	Sheldon.....	E	Elect.	W—.....	2-R	.....	R	Own.....	116	36x4	36x4d	C. T.....
13	B	S C S	Own.....	½	½	Own.....	E	C	W—Jones.....	2-R	Own...	P	Own.....	120	36x4	36x3d	Lansden.....
14	S	C S	Own.....	½	½	Mather.....	...	...	W—.....	2-R	Own...	P	Own.....	111	36x4	36x6	Oneida, 2E.....
15	N	S S	Own.....	½	½	Mather.....	C	E	S—Own.....	2-R	Ross...	PorR	Own.....	112	36x4	38x6	Walker, L.....
16	.....	W	Sheldon..	½	½	Sheldon.....	E	E	W—Schwarz.....	2-R	Own...	R	Own.....	114	36x4	36x6	Ward, WD.....
																	7,000 Pounds:
17	.....	C	Timken..	½	½	.....	...	...	.....	2-R	Ross...	.....	.....	135	36x5	40x4d	Atlantic, 3C.....
18	B	S	.....	½	½	.....	...	...	...—Own.....	4-A	Own...	.....	.....	96	36x4d	36x4d	Couple-Gear, H.....
19	S	C S	Own.....	½	½	Sheldon.....	C C	Elect.	W—.....	2-R	.....	R	Own.....	126	36x5	36x5d	C. T.....
20	S	C S	Own.....	½	½	Sheldon.....	C C	Elect.	W—.....	4-A	.....	R	Own.....	122	36x34d	36x4d	C. T.....
21	B	C	Own.....	½	½	Own.....	E	C	W—Jones.....	2-R	Own...	P	Own.....	130	36x5	36x4d	Lansden.....
22	N	S	Own.....	½	½	Mather.....	C	E	S—Own.....	2-R	Ross...	Por R	Own.....	131	36x5	38x5d	Walker, P.....
23	.....	W	Sheldon..	½	½	Sheldon.....	E	E	W—Schwarz.....	2-R	Own...	R	Own.....	132	36x5	36x8	Ward, WF.....
																	10,000 Pounds:
24	.....	C	Timken..	½	½	.....	...	...	.....	2-R	Ross...	.....	.....	144	36x6	40x5d	Atlantic, 5C.....
25	B	S	.....	½	½	.....	...	...	...—Own.....	4-A	Own...	.....	.....	96	36x5d	36x5d	Couple-Gear, A.....
26	S	B C S	Own.....	½	½	Sheldon.....	C	Elect.	W—.....	4-A	.....	R	Own.....	132	36x4d	36x5d	C. T.....
27	S	C S	Own.....	½	½	Own.....	E C	C	W—Jones.....	2-R	Own...	P	Own.....	142	36x6	36x5d	Lansden.....
28	N	C S	Own.....	½	½	Mather.....	C	E	S—Own.....	2-R	Ross...	PorR	Own.....	141	36x6	38x6d	Walker, N.....
29	.....	W	Sheldon..	½	½	Sheldon.....	E	E	W—Schwarz.....	2-R	Own...	R	Own.....	144	36x6	38x10	Ward, WH.....
																	12,000 Pounds:
30	.....	C	Timken..	½	½	.....	...	...	.....	2-R	Ross...	.....	.....	156	36x6	40x6d	Atlantic, 6C.....
31	B	C	Own.....	½	½	Own.....	E	C	W—Jones.....	2-R	Own...	P	Own.....	...	.....	.....	Lansden.....
																	14.000 Pounds:
32	B	B	.....	½	½	.....	.....	.....	...—Own.....	4-A	Own...	.....	.....	96	36x5d	36x6d	Couple-Gear, LD....

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Motor Truck Makers

[*Continued from page 49.*]

Shaw Corp. (Walden W.), Chicago.—2-ton.
Signal Motor Truck Co., Detroit.—1, 1½, 2, 3½ & 5-ton.
Standard Motor Truck Co., Detroit.—2, 3½ & 5-ton.
Steele (W. W.), Worcester, Mass.—2, 3, 4 & 5-ton.
Sterling Motor Truck Co., Milwaukee, Wis.—1½, 2½, 3½, 5 & 7½-ton.
Stewart Motor Corp., Buffalo, N. Y.—¾, 1, 1½, 2 & 3½-ton.
Stoughton Wagon Co., Stoughton, Wis.—1½, 2 & 2½-ton.
Sullivan Motor Truck Corp., Rochester, N. Y.—1½ & 2-ton.
Superior Motor Truck Co., Atlanta, Ga.—1 & 2-ton.
Texan—Texas Motor Car Assn., Fort Worth, Tex.—¾ & 1½-ton.
Texas Motor Car Assn. See Texan.
Tiffin Wagon Co., Tiffin, O.—¾, 1½, 2½, 3½, 5 & 6-ton.
Titan Truck Co., Milwaukee, Wis.—3½ & 5-ton.
Tower Motor Truck Co., Greenville, Mich.—2 & 3½-ton.
Traffic Motor Truck Corp., St. Louis, Mo.—2-ton.
Transport Motor Truck Co., Mt. Pleasant, Mich.—1, 1½ & 2½-ton.
Triangle Motor Truck Co., St. John's, Mich.—1½ & 2-ton.
Turnbull Motor Truck & Wagon Co. See Defiance.
Ultimate—Vreeland Motor Co., Newark, N. J.—1½ & 2½-ton.
Union Motor Truck Co., Bay City, Mich.—2½ & 4-ton.
United Motors Co., Grand Rapids, Mich.—1½, 2½, 3½, 5 & 6-ton.
United States Motor Truck Co. See U. S.
Universal Service Co., Detroit.—1½, 2 & 3-ton.
U. S.—United States Motor Truck Co., Cincinnati, O.—1½, 2½, 3½ & 5-ton.
Velie Motor Corp., Moline, Ill.—1½, 2 & 3½-ton.
Victor Motor Truck & Trailer Co., Chicago.—1½, 2 & 3½-ton.
Vim Motor Truck Co., Philadelphia.—½, 1, 2 & 3-ton.
Vreeland Motor Co. See Ultimate.
Walker Vehicle Co., Chicago.—½, 1, 2, 3½ & 5-ton electric.
Walker-Johnson Truck Co., Woburn, Mass.—2½-ton.
Walter—Milwaukee Locomotive Mfg. Co., Milwaukee, Wis.—3-ton.
Walter Motor Truck Co., New York.—5-ton.
Ward Motor Vehicle Co., Mt. Vernon, N. Y.—750-lb., ½, 1, 2, 3½ & 5-ton electric.
Ward La France Motor Truck Co., Inc., Elmira, N. Y.—2½ & 3½-ton.
Watson Products Corp., Canastota, N. Y.—¾, 1½, 2½ & 3½-ton.
White Co., Cleveland, O.—¾, 2, 3½ & 5-ton.
White Hickory Motor Corp., Atlanta, Ga.—¾, 1½, 2½ & 3½-ton.
Wichita Motors Co., Wichita Falls, Tex.—1½, 2, 2½, 3½ & 6-ton.
Wilcox Motor Co. (H. E.), Minneapolis, Minn.—1, 1½, 2½, 3½ & 5-ton.
Wilson Co. (J. C.), Detroit.—1, 2, 3½ & 5-ton.
Winther Motor Truck Co., Kenosha, Wis.—1½, 2, 3, 3½, 4, 5, 6 & 7-ton.
Winther-Marwin—Winther Motor Truck Co., Winthrop Harbor, Ill.—1½ & 3½-ton.
Witt-Will Co., Inc., Washington, D. C.—1½ & 2½-ton.
Wolverine—American Commercial Car Co., Detroit, Mich.—1½-ton.

TRUCK PARTS MAKERS

Adams Axle Co., Findlay, Ohio.—Axles.
Alloy Steel Spring & Axle Co., Jackson, Mich.—Springs.
American Bosch Magneto Co., New York.—Magnetos.
American Magneto Co., Toledo, O.—Magnetos.
Archibald Wheel Co., Lawrence, Mass.—Wheels.
Armstrong Mfg. Co. (J. B.), Flint, Mich.—Springs.
Atwater-Kent Mfg. Works, Philadelphia.—Magnetos.
Auto Radiator Mfg. Co., Chicago.—Radiators.
Auto Wheel Co., Lansing, Mich.—Wheels.
Beaver Mfg. Co., Milwaukee, Wis.—Engines.
Beneke & Kropf, Chicago.—Carbureters.
Betts Spring Co., San Francisco, Cal.—Springs.
Bimel Spoke and Auto Wheel Co., Portland, Ind.—Wheels.
Borg & Beck, Moline, Ill.—Clutches.
Bremer Mfg. Co., Chicago.—Radiators.
Brown-Lipe Gear Co., Syracuse, N. Y.—Clutches and transmissions.
Brown-Lipe-Chapin Co., Syracuse, N. Y.—Differentials.
Buda Co., Harvey, Ill.—Engines.
Budd Wheel Corp., Philadelphia.—Wheels.
Bush Mfg. Co., Hartford, Conn.—Radiators.
Byrne-Kingston Co., Kokomo, Ind.—Carbureters.
Candler Radiator Co., Detroit, Mich.—Radiators.
Carter Carbureter Co., St. Louis, Mo.—Carbureters.
C. A. S. Products Co., Detroit.—Springs.
Champion Auto Spring Co., St. Louis, Mo.—Springs.
Chicago Mfg. Co., Chicago.—Radiators.
Chicago Standard Axle Co., Chicago.—Axles.
Clark Equipment Co., Buchanan, Mich.—Axles, wheels.
Cleveland Canton Spring Co., Canton, O.—Springs.
Connecticut Telephone & Electric Co., Meriden, Conn.—Ignition apparatus.
Continental Motors Corp., Detroit.—Engines.
Cotta Gear Co., Rockford, Ill.—Clutches, transmissions.
Cotta Transmission Co., Rockford, Ill.—Clutches, transmissions.
Covert Gear Co., Detroit.—Transmissions.
Dayton Engineering Laboratories Co., Dayton, O.—Ignition apparatus.
Dayton Steel Foundry Co., Dayton, O.—Wheels.
Delaney & Son, Newark, N. J.—Springs.
Detlaff Co. (A. J.), Detroit.—Clutches.
Detroit Gear & Machine Co., Detroit.—Clutches, transmissions.
Detroit Pressed Steel Co., Detroit.—Frames, wheels.
Detroit Steel Products Co., Detroit.—Springs.
Ditwiler Mfg. Co., Galion, O.—Steering-gears.
Dunbar Mfg. Co., Chicago.—Frames.
Duplex Engine Governor Co., Brooklyn, N. Y.—Governors.
Durston Gear Corp., Syracuse, N. Y.—Transmissions.
Dyneto Electric Corp., Syracuse, N. Y.—Ignition apparatus.
Eberly & Orris Mfg. Co., Mechanicsburg, Pa.—Wheels.
Eisemann Magneto Co., Brooklyn, N. Y.—Magnetos.
El Arco Radiator Co., New York City.—Radiators.
Electric Auto-Lite Corp., Toledo, O.—Ignition apparatus.
Empire Axle Co., Dunkirk, N. Y.—Axles.
English & Mersick Co., New Haven, Conn.—Radiators.
Ensign Carburetor Co., Los Angeles, Cal.—Carbureters.
Ericsson Mfg. Co., Buffalo, N. Y.—Magnetos.
Eureka Auto Parts Mfg. Co., St. Louis, Mo.—Radiators.
Fedders Mfg. Co., Buffalo, N. Y.—Radiators.
Fiechter & Co. (L. V.), Long Island City, N. Y.—Carbureters.
Flexo Mfg. Co., Los Angeles, Cal.—Radiators.
Fuller & Sons Mfg. Co., Kalamazoo, Mich.—Clutches, transmissions.
Garden City Spring Works, Chicago.—Springs.
Gemmer Mfg. Co., Detroit.—Steering-gears.
General Electric Co., Schenectady, N. Y.—Controllers, electric motors.
Golden, Belknap & Schwartz, Detroit.—Clutches, engines.
Grant-Lees Gear Co., Cleveland, O.—Transmissions.
Gray Motor Co., Detroit.—Engines.
G & O Mfg. Co., New Haven, Conn.—Radiators.
Harrison Radiator Corp., Lockport, N. Y.—Radiators.
Hartford Automotive Parts Co., Hartford, Conn.—Clutches.
Harvey Spring Co., Racine, Wis.—Springs.
Hayes Motor Truck Wheel Co., St. Johns, Mich.—Wheels.
Hercules Motor Mfg. Co., Canton, O.—Engines.
Herschell-Spillman Co., North Tonawanda, N. Y.—Engines.
Higgins Spring & Axle Co., Racine, Wis.—Axles, springs.
Hinkley Motors Corp., Detroit.—Engines.
Holley Carburetor Co., Detroit.—Carbureters.
Hoopes Bros. & Darlington, Inc., West Chester, Pa.—Wheels.
Hoosier Auto Parts Co., Muncie, Ind.—Clutches.
Hooven Radiator Co., Chicago.—Radiators.
Hydraulic Pressed Steel Co., Cleveland, O.—Frames.
Ideal Sheet Metal Works, Chicago.—Radiators.
Iron City Spring Co., Pittsburgh, Pa.—Springs.
Industrial Equipment Co., San Francisco, Cal.—Axles.
Jackson Auto Radiator Wks., Chicago.—Radiators.
Jackson-Church-Wilcox Co., Saginaw, Mich.—Steering-gears.
Johnson Co., Detroit.—Carbureters.
Jones & Co. (Phineas), Newark, N. J.—Wheels.
Kalamazoo Spring & Axle Co., Kalamazoo, Mich.—Axles, springs.
Kells Mfg. Co. (W. J.), New York City.—Radiators.
Kelsey Wheel Co., Inc., Detroit.—Wheels.
K. W. Ignition Co., Cleveland, O.—Magnetos.
Lackawanna Steel Co., Buffalo, N. Y.—Frames.
Lavine Gear Co., Milwaukee, Wis.—Steering-gears.
LeRoi Co., Milwaukee, Wis.—Engines.
Long Mfg. Co., Detroit.—Radiators.
Lycoming Foundry & Machine Co., Williamsport, Pa.—Engines.
Maremont Mfg. Co., Chicago.—Springs.
Marlin-Rockwell Corp., New Haven, Conn.—Radiators.
Marvel Carburetor Co., Flint, Mich.—Carbureters.
Master Carburetor Co., Los Angeles, Cal.—Carbureters.
Mather Spring Co., Toledo, O.—Springs.
McCord Mfg. Co., Detroit.—Radiators.
Merchant & Evans Co., Philadelphia.—Clutches.
Merrill Spring Co. (E. R.), New York.—Springs.
Miller Mfg. Co., Los Angeles, Cal.—Carbureters.
Modine Mfg. Co., Racine, Wis.—Radiators.
Monarch Governor Co., Detroit.—Governors.
Muncie Gear Works, Muncie, Ind.—Clutches.
Mutual Wheel Co., Moline, Ill.—Wheels.
National Can Co., Detroit.—Radiators.
National Spring Co., New Castle, Ind.—Springs.
North American Motors Co., Pottstown, Pa.—Engines.
North East Electric Co., Rochester, N. Y.—Ignition apparatus.
Parish Mfg. Co., Reading, Pa.—Frames.
Parish & Bingham, Cleveland, O.—Frames.
Penn Spring Works, Inc., Baldwinsville, N. Y.—Springs.
Perfection Radiator Co., New York.—Radiators.
Perfex Radiator Co., Racine, Wis.—Radiators.
Peru Auto Parts Mfg. Co., Peru, Ind.—Axles.
Philadelphia Storage Battery Co., Philadelphia.—Batteries.
Pierce Governor Co., Anderson, Ind.—Governors.
Prudden Wheel Co., Lansing, Mich.—Wheels.
Remy Electric Co., Detroit.—Magnetos.
Rome-Turney Radiator Co., Rome, N. Y.—Radiators.
Ross Gear & Tool Co., Lafayette, Ind.—Steering-gears.
Rowland (William & Harvey), Philadelphia.—Springs.
Royer Wheel Co., Aurora, Ind.—Wheels.
Russel Motor Axle Co., Detroit.—Axles.
Rutenber Motor Co., Marion, Ind.—Engines.
Salisbury Wheel & Axle Co., Jamestown, N. Y.—Axles, wheels.
Savage Arms Corp., Sharon, Pa.—Frames, transmissions.
Schwarz Wheel Co., Philadelphia.—Wheels.
Shakespeare Co., Kalamazoo, Mich.—Carbureters.
Sheldon Spring & Axle Co., Wilkes-Barre, Pa.—Axles, springs.
Simms Magneto Co., East Orange, N. J.—Magnetos.
Smith Corp. (A. O.), Milwaukee, Wis.—Frames.
Smith Wheel, Inc., Syracuse, N. Y.—Wheels.
Sparks-Withington Co., Jackson, Mich.—Radiators.
Splitdorf Electrical Co., Newark, N. J.—Magnetos.
Spring Perch Co., Bridgeport, Conn.—Springs.
Standard Parts Co., Cleveland, O.—Axles, frames, springs.
Standard Radiator Co., Springville, N. Y.—Radiators.
Standard Steel Spring Co., Coraopolis, Pa.—Springs.
Standard Wheel Co., Terre Haute, Ind.—Wheels.
St. Mary's Wheel & Spoke Co., St. Mary's, Ohio.—Wheels.
Tillotston Mfg. Co., Toledo, O.—Carbureters.
Timken-Detroit Axle Co., Detroit.—Axles.
Torbensen Axle Co., Cleveland, O.—Axles.
Triple Action Spring Co., Chicago.—Springs.
Tuthill Spring Co., Chicago.—Springs.
United States Spring Co., Los Angeles, Cal.—Springs.
Waukesha Motor Co., Waukesha, Wis.—Engines.
Wayne Wheel Co., Newark, N. Y.—Wheels.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.—Controllers, electric motors.
West Steel Castings Co., Cleveland, O.—Wheels.
Wheeler-Schebler Carburetor Co., Indianapolis, Ind.—Carbureters.
Wilcox-Bennett Carburetor Co., Minneapolis, Minn.—Carbureters.
Wisconsin Motor Mfg. Co., Milwaukee, Wis.—Engines.
Wisconsin Parts Co., Oshkosh, Wis.—Axles.
Wohlrab Gear Co., Racine, Wis.—Steering-gears.
Zenith Carburetor Co., Detroit.—Carbureters.

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'Buses to Move Future Masses

By R. E. FULTON
Vice-President, International Motor Company

IN a consideration of the reasons for the growing acceptance of the motor 'bus as an economic necessity in passenger transportation, it is well to first examine the ultimate effect of increases in population upon traffic facilities. While the necessity for immediate action to solve serious congestion problems is now being felt only by the larger cites, the requirements of smaller cities and their future development deserve just as much consideration to prevent this congestion in years to come.

Traffic facilities may be divided into two classes, public utility transportation lines and highways to accommodate privately owned vehicles.

It is evident that the traction lines are becoming more and more inadequate to handle the congestion that is increasing every day. Since the amount of traffic they will hold is limited by the tracks on which they run, it will be impossible for them to keep up with the growing needs of transportation unless new tracks are laid. This, however, is prohibited by the increasing congestion of privately owned vehicles on the highways. Increasing population on the one hand demands more public transportation facilities. The increasing number of privately owned passenger and commercial motor vehicles on the other hand demands better highway facilities. Can one factor be satisfied except at the expense of the other?

THE present serious financial condition of these public utility corporations throughout the country is bound to mean increased fares, and the burdens imposed upon them by increasing population is bound to mean more and more congestion. The motor 'bus will not only solve the serious traffic problem, but will provide the public with a more flexible satisfactory mode of transportation at a lower cost.

In the majority of large cities it is out of the question to lay more tracks for surface car lines in thickly populated business and residential sections—there is no room for them. In view of this fact it is only logical to assume that motor 'buses will be used to relieve the congestion, as they are free to operate on any route without tracks. And it is very possible that the time will come when traffic will have increased to such an extent that the streets will seem unable to hold it. In this event the only solution would be the discontinuance of surface car lines and the substitution of motor 'buses. This for the simple reason that 'buses do not block the highways, being flexible and able to move about in traffic. Surface cars, on the other hand, do block traffic—this fact can not be denied.

AS far as less thickly populated sections are concerned, there is every reason to believe that future development of transportation facilities will favor the motor 'bus. The laying of tracks for a surface car line represents a huge initial expense for right-of-way, bridges, grading and rails. If such a line does not prove profitable, it can not be diverted. The flexibility of the motor 'bus system, however, does not confine it to any one fixed route.

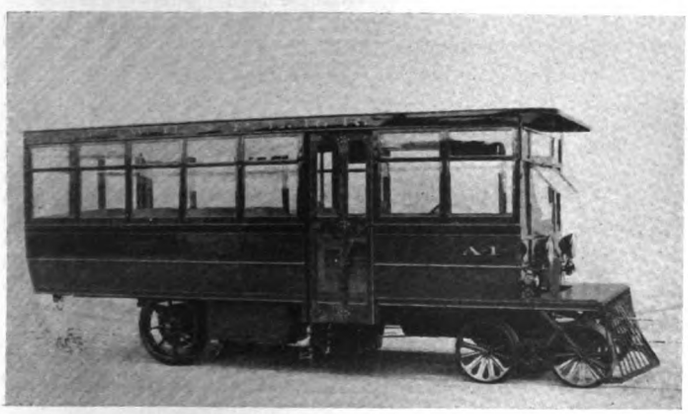
Public utility corporations everywhere are gradually losing the faith of investors. Their inability to increase fares to keep up with increasing costs of operation considerably decreases their dividends. In view of this, it is becoming increasingly difficult to find investors who will lend the money to build and equip new traction lines, while far better inducements are offered in other securities.

Efficiency and economy of operation are in favor of the motor 'bus. This has been proved in New York City by the success of motor 'bus lines established to take the place of traction lines that could not pay for themselves. Then, too, when Brooklyn traction companies raised their fares and people refused to pay the advance, a fleet of motor 'buses solved the problem by taking the Brooklynites to their places of business. They not only were able to operate profitably on the lower fare basis, but proved to be quicker and far more comfortable than the trolley lines.

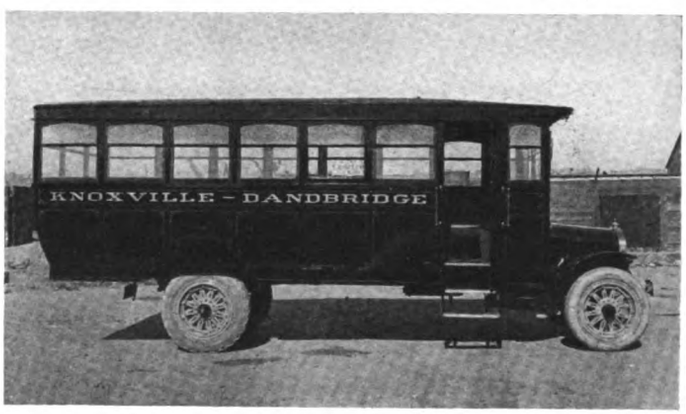
These economies are principally due to the fact that the tremendous overhead expenses of the surface car lines are eliminated in the operation of motor 'buses. The 'bus is its own power plant and it consumes power only when in operation. Since it is speedier than the surface car, a 'bus can make more trips per day, thereby increasing the revenue per unit of expenditure.

Motor 'bus routes offer many conveniences that can not be offered by traction lines. Another point—they unload passengers at the curb, which is much safer. In case of a blockade, a 'bus can detour. This fact alone works as a benefit in two ways—it makes a more dependable transportation system and tends to relieve the congestion incidental to blockades. Not being confined to tracks, 'buses can receive and discharge passengers nearer to their homes. Then, too, we have the obvious fact that people would rather ride in a motor 'bus, not only because of its conveniences, but because of the suggestion it conveys of pleasurable outdoors.

A MOVEMENT that had its inception in California and that is gradually spreading to other parts of the country is the use of motor 'buses to provide better educational facilities. By the consolidation of rural schools and the use of 'buses to carry the pupils to and from them, a come complete curriculum is offered to the children in rural districts. This is but one instance of the adaptability of the 'bus in the development of sparsely populated sections. Where a traction system is needed, but is too costly to be profitable, the economical motor 'bus can be relied upon to fill the need. There are seasonable needs for transportattion service that can only be filled by the motor 'bus. Summer resorts, for instance, often can not support a surface car line the year through, while the



Motor 'bus equipped to run on rails.



'Bus operating in Knoxville, Tenn.

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'bus can be diverted to other channels out of the busy season.

The motor 'bus is also a big factor in solving the industrial labor problem. Factory sites within city limits where labor is available are scarce. The use of 'buses to carry employees to outlying sections where sites are obtainable is gradually being recognized as the logical solution to the problem.

A short time ago a party of ladies left Easton, Pennsylvania, in a pneumatic-tired motor 'bus to attend a matinee theatre performance in New York City, a distance of 73 miles by train. They left in the morning, arrived in plenty of time for the matinee and returned to their homes in the 'bus that same evening. Such illustrations of the potentialities of the motor 'bus make it easy to conceive the time when commuters will travel to business in 'buses more quickly and comfortably than by means of suburban trains. Metal laid roads designed for one-way motor traffic with no speed limit are inevitable.

All through the development of passenger transportation in every section, from the large city to the rural community, the motor 'bus will be felt more and more as the years go by.

New style body used on Chicago 'buses.

Timely Snow Removals Cost Less Than Repairs to Orphan Highways

The larger part of the tonnage of all railroads is transported over the highways in part of its course of distribution. A highway is built for utilitarian purposes only. Because of this a road repair is made when necessary. If highways are to be 100 per centum efficient, it is very essential that the traffic be not obstructed by snow. Mail, parcel post and express service is as important in winter as summer. The transportation of coal and other fuel is more important in winter than in summer and upon main market roads and mail routes it is just as essential to have them free from snow as it is for railroad tracks to be free from snow.

There must be a method and organization for repair, maintenance and the removal of snow or other obstructions at the same time the road is open for traffic. The same state highway organization which is used for maintenance and repair should be used for snow removal. If there were little or no demand for traffic during snow weather, the cost of snow removal would be justified anyway. If snow be permitted to melt on the roadbed it tends to soften the subgrade and loosen the base under the wearing surface. Evidences of these damages may be seen after heavy snows in the late winter and early springtime. If snow is not removed on a trunk highway, the traffic will gradually break its way through when thaw begins. The traffic will create one or two sets of ruts or tracks. The constant tracking in the same rut produces disastrous results to the road surface, making repairs difficult and expensive. A larger percentage of road repairs are due to winter traffic than to summer traffic. This is due to the neglect of the highways during snowtime.

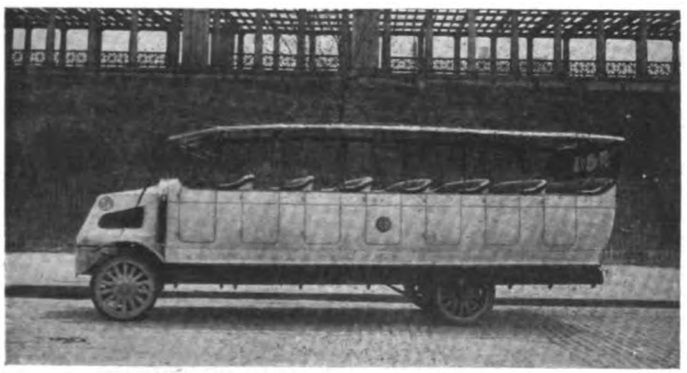
The Connecticut state report shows that the total cost of snow removal during the heavy snowfall winter of 1917 was slightly over $40,000 on a total of 970 miles. Including the equipment, the rate per mile would be about $45. Under normal conditions of snowfall this figure would probably not reach $30 per mile. The cost of snow removal, therefore, is considerably less than the cost of damage to the road itself if the snow is allowed to remain on the surface.

In Pennsylvania, during the same year, the cost of keeping snow from the state highways, used mostly by army trucks, was from $50 to $500 per mile. Considering that the highest figures were for the cost of keeping the state roads clear on the Allegheny Mountain ridges, it will readily be seen that even this amount justified the saving that would be made in the regular maintenance cost of the mountain roads.

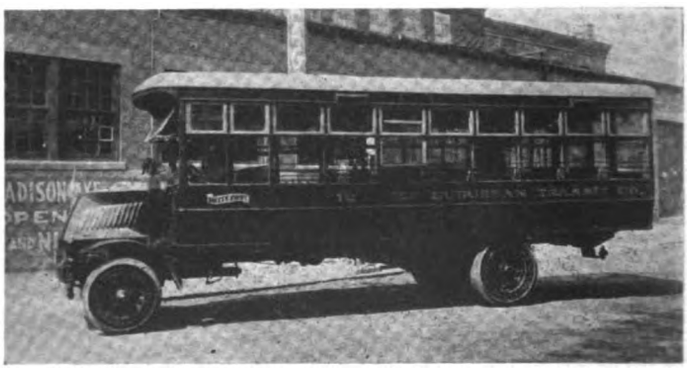
Cotta Transmission Adds New Heads and Plans Large Sales Extensions

Interesting news of the rapid progress of the Cotta Transmission Company, Rockford, Illinois, in the motor truck and tractor transmission field was announced in information regarding the company's plans for large expansion during 1920. New production progress is being made and the sales arrangements for the new year are extensive. D. W. Bay, formerly sales engineer of the Motor Bearings Division of the Hyatt Roller Bearing Company, has been appointed sales manager of the Cotta organization. F. W. Ramey, who returned from overseas to take up duties on the sales staff of the Cotta Transmission Company, is Mr. Ray's assistant.

W. J. McLaughlin, formerly of the Continental Motors Corporation, is in charge of production. The building of transmissions has been placed on a large quantity basis by means of the progressive system of assembly. In the past year the organization, switching from a production that was 90 per cent for war purposes, has brought its commercial sales and production up past the high point of war work.



'Bus body after English style.



Suburban Transit Company 'Bus, Plainfield, N. J.

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New Tire Machine Offers Relief In Mounting of Giant Pneumatics

The Vance Engineering Company, 227-233 West Erie Street, Chicago, announces to the trade a tire-setting machine, which it claims is one of the biggest boons to the manufacturers and users of large pneumatic tires yet produced. Realizing that the use of large pneumatic tires on heavy motor trucks is practical and knowing the difficulty encountered in placing a tire of large dimension on a rim, likewise the removal of such a tire, this company began experimental work several months ago on a device to reduce this process to a minimum, and after numberless tests on all sizes of tires and types of rims, finally produced the machine as shown in the accompanying cut.

Probably the biggest factor in connection with the machine is that of the speed with which tires are placed on rims or removed therefrom. Tests on various makes of tires show the following results:

48 by 10 inch, one tire q. d. rim 2 minutes.

38 by 7 inch, one tire q. d. rim 1⅞ minutes.

35 by 5 inch, one tire s. s. split 2 minutes.

34 by 4½ inch, one tire clincher q. d. 1½ minutes.

Removals are made in like time. It is quite common under the old method, to have two men spend 30 minutes to an hour in hard, nerve-racking labor placing one of these tires on the rim, even when working under ideal conditions. The care which must be exercised when doing the work by hand for fear of damaging the bead or the rim naturally means slow work. The saving in time apaprently is great. The positive and uniform operation and pressure as applied, assures a lesser wear on the bead of the tire, which is the all important spot that has to be contended with.

The fact that the machine is operated by foot power, eliminating extras in the way of motor or other driving power, and takes up a space of only 16 square feet, makes it an easy and inexpensive installation. The machine is well constructed along simple lines, all parts being machined, hydraulic pressure being the motive power, and all parts are easily accessible. Various shoes are furnished as a part of the standard equipment enabling one to handle rims of all types. The change from one set of shoes to another can be made in less than one minute.

The manufacturers claim to be in a position to make immediate delivery, although a steady increase in the volume of business is crowding them for space and material.

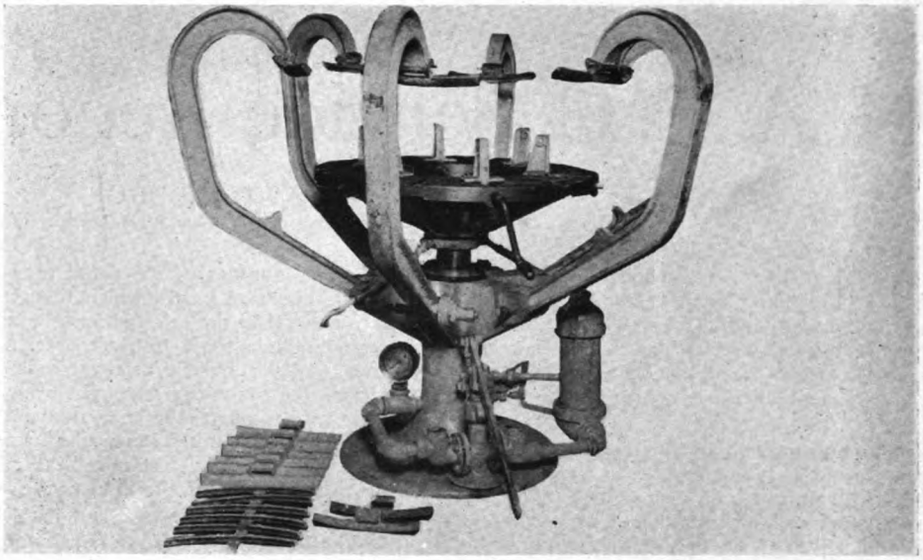
Kelly-Springfield Motor Truck Co. Starts Large Building Program

Erection of large factory buildings and an attractive three-story office building have been started by the Kelly-Springfield Motor Truck Company, according to announcement made by President James L. Geddes in speaking of plans for expansion of the facilities of the plant to meet the demands of the trade.

These buildings are to be of reinforced concrete and will be used as additional machine shops. The wrecking of the old office building has been started. This site will be occupied for additional manufacturing buildings.

The three-story office buiding will be located in the newly acquired property in Sheridan Avenue. It will be of the most modern type, and will be equipped with the latest in office construction.

Machinery and equipment have been purchased, much of which is in transit. This will be installed in the new factory buildings as soon as they are ready. Manufacturing schedules have been prepared, Mr. Geddes says, which will enable the company to turn out a finished motor truck every twenty minutes.



New machine for mounting giant pneumatic tires.

Truck With Electro Magnet to Do Work of Twenty Laborers

The Union Motor Truck Company, of Bay City, Michigan, has the distinction of manufacturing the first motor truck equipped with an electro-lifting magnetic crane. The machine has a 4-ton capacity and is a special order. It was tested recently and found to measure up to requirements. It is said that it will do the work of 20 laborers.

The crane was manufactured by the Bay City Foundry & Machine Company. All operations are performed by power. It is equipped with quick-acting out-riggers in order to insure stability. The motor truck and crane can be used for loading or unloading cars of iron, etc., for handling scrap iron in yards, for loading other motor trucks or drays or for loading the motor truck itself, and can be used as a crane in handling any heavy object.

This motor truck was manufactured as a special order for a Detroit concern and will be sold at a consideration of $12,000.

Truck Takes Bull by Horns, Drags Him from Island to Slaughter

Recently an enraged western bull just shipped into the Sioux City stock yards scaled the ten-foot fence at the yards and, closely pursued, fled toward the Missouri River. At the river bank he did not hesitate, as was expected, but dashed into the icy water and swam a couple of hundred yards to an island formed during the early summer. As these islands are usually formed of quicksand, it was believed the animal would sink in the sand and that he would soon be lost sight of. Not so, however. The dry weather hardened the sand until the bar or island was like a great slab of stone. The bull was safe, and contented himself browsing the short grass that had grown there late in the fall.

Half a dozen cowboys were lowered by rope from the combination bridge to the island (there were no boats closer than Riverside) and finally lassoed the bull, after which a longer and heavier rope was attached and a heavy motor truck on the Nebraska side finally dragged the big brute into the water and safe onto land again.

Ryan Heads Stromberg

Allan A. Ryan has resigned as vice-president of Stromberg Carburetor Company of America, and has been elected chairman of the board of directors. J. R. Coffin has been elected a director in the company to fill the vacancy created by the resignation of H. C. Stutz and Mr. Coffin has also been elected vice-president in place of Mr. Ryan.

Motor Trucks in Australia

There has been an increase during the past twelve months of approximately 8,000 motor vehicles in Australia; the total number of cars and commercial motor vehicles is now given as 55,459. In New South Wales there are now 1,790 motor lorries and 327 motor cabs.

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N. A. C. C. Service Recommendations

By E. T. HERBIG
Sales Manager, Service Motor Truck Company

THE National Automobile Chamber of Commerce Committee on Revision of Service and Repair Parts Policies was appointed to consider what changes for the better might be suggested in the policies that had been in existence for years.

The appointment of this committee was the result of a paper I read before the Truck Manufacturers' Convention, held in New York last February under the auspices of the N. A. C. C., in which paper it was stated that after careful study the conclusion had been reached that the existing policies were quite satisfactory, there being no outstanding deficiencies even with the consistent growth of the industry. Most of the suggestions offered were of minor importance and stimulated by the consistent progress of the motor truck industry which justified certain distinctions being made in the text of the policies, so as to more appropriately meet the situation, the general principles, however, remaining quite identical.

In the place of the technical obligation called the Warranty, the committee felt a set of principles, as a working basis and a medium of understanding, could well be formulated, in which would be incorporated an expression of the manufacturers', distributers' and dealers' and the users' responsibilities, respectively. In this connection, it should be recalled that the committee's interest has been primarily in the motor truck industry, the platform designed having reference thereto.

A READING of the principles or platform will make clear the broad idea in mind and help visualize the demarcation of lines of responsibility, in which the user as well as the manufacturer and his representative share.

1. Manufacturers' Square Deal Warranty

Satisfactory relationship between manufacturer and user is contingent upon mutual good faith. All manufacturers should guarantee to make good all their just obligations expressed or implied, which will assure each and every user the maximum of motor truck service and at the minimum of consistent cost.

2. Distributers' and Dealers' Responsibility

The best maintenance results can be obtained with the user through distributers and dealers representing the manufacturer. The distributers' and dealers' service obligations are:

(a) To carry out the manufacturers' square deal warranty with the user.

(b) To maintain adequate facilities for making repairs, adjustments, and do general overhauling in a prompt and competent manner at reasonable charges.

(c) To thoroughly instruct the user in the proper care and operation of the motor truck.

3. Users' Responsibility

The greatest responsibility for satisfactory motor truck service rests upon the user. The responsibility of proper operation and care, are entirely beyond the control of the manufacturer and distributer. Upon the user, carrying out consistently and intelligently the instructions on care and operation, depends the success of motor truck service.

There follow then in the committee's recommendations, outlines of the detail practices under the above heads, which though similar in general to the original text, have been considerably altered to meet present conditions, and particularly as regards the motor truck, the committee's thought being to provide a set of detail practices that all motor truck manufacturers can well afford to adopt, the resultant standardization working to the benefit of the industry.

It is advisable that the suggested detail practices be read, and any comments or suggestions will be appreciated by the committee, which is striving to accomplish the most efficient standardized basis of operation.

Replacement of Defective Parts:

(a) Within ninety days after delivery of a new motor truck to user, the manufacturer will furnish, free of charge at the factory or branch, duplicate parts to replace any parts that are returned to the factory or branch, with shipping charges prepaid, and which are determined by the company to have been defective in material or workmanship, or it will put such parts in condition as good as new without charge.

Repair Parts Service:

(b) Discounts to independent repair shops will be subject to agreement between distributer or dealer and the repair shop.

(c) The manufacturer reserves the right to dispose, within thirty days, all parts returned, without assuming liability, unless covered by shipping instructions or adjustment is accepted.

(d) The manufacturer will refuse to consider claims for, or accept for adjustment, any parts not supplied by him.

Accessory Service:

(e) For service and replacements on engine starters, batteries, magnetos, generators, carbureters, tires, rims or other trade accessories that are not made by the manufacturer of the motor truck, application should be made direct to the nearest service station maintained by the maker of such accessory. While not assuming any direct responsibility for articles not made by them, the manufacturer, its branches or dealers, will do all possible to assure the user of a square deal from the maker of these parts or accessories. If, however, the accessory dealer is not adequately represented in a particular locality, the dealer therein is obligated to give the user proper service on such accessories.

(f) Manufacturers shall provide dealers with a list of manufacturers of accessories used on their motor trucks and a list of service stations.

Inspection and Adjustment:

(a) Motor trucks brought to service stations maintained by factory, branch or dealer will be inspected monthly without charge. The same service will be rendered at points outside of the service station at a regular charge based on the distance. Inspection includes examination and report by the inspector of his opinion of the condition of the truck.

(b) Necessary adjustments, to put the truck in standard operating condition, will be made without charge during the first month after delivery of a new truck to user, provided the truck has not been tampered with nor injured by accident, abuse or neglect. After the first month, adjustments will be made at the regular charges of the service station. Adjustment includes only such adjustments as the inspector has, in his opinion, found necessary to put the truck in standard operating condition.

(c) Every dealer is expected to give the same inspection and adjustment service on any truck made by the manufacturer without regard to the territory in which it was bought.

Repairs, Replacements, Etc.:

(d) All work not included in inspection and necessary adjustment or installation of replacements will be charged for at regular rates.

(e) When any charge work is to be done and the cost can be estimated in advance, the user, upon request, will be advised of the approximate or maximum amount of the charges before the work is begun.

(f) When it is necessary, for the convenience of the user, to render service at a distance from the service station, the time spent by employes going to and from the job will be charged for at the regular rates of the station, together with all proper expenses of making the trip, cost of shipping parts, if any, and other necessary incidental expenses.

Overtime Work:

(g) Any overtime, holiday or Sunday work done upon the request of the user, will be charged for at the regular overtime rate.

Instruction:

(h) On delivery of a new truck, personal driving and maintenance instructions will be furnished for a reasonable period without charge. All other personal instructions will only be given in accordance with the agreement between the customer and the dealer at the time of purchase.

Repair Parts:

(i) The dealer will be required to maintain a minimum stock of both "current" and "service" parts as specified by manufacturer.

(j) The dealer will be required to furnish an inventory of current and service parts upon request.

(k) Stocks of parts shall be designated as follows:

1. **Current Parts**—All parts used in trucks of models being produced by the factory.
2. **Service Parts**—All parts for models no longer being produced by the factory and which have not been superseded by other parts that are interchangeable with them.
3. **Obsolete Parts**—Parts that have been superseded by other parts that are interchangeable with them.

Return of Parts:

(l) Parts claimed defective must be returned to the factory with shipping charges prepaid, within ten days from date of replacement. The date when defect was discovered, manufacturer's number of the truck and owner's name and address must be given on a tag attached to part.

(m) Obsolete parts may be returned only by individual agreement with the manufacturer.

(n) Surplus parts may be returned only by individual arrangement with the manufacturer. All parts shipped to the manufacturer by dealer shall have transportation charges prepaid and be properly tagged.

WE now come to the most important part of the triangle of responsibility —that of the user, whose responsibility has unfortunately been too little emphasized, but who will, by the proper dissemination of a plain statement of facts, shoulder his burden of the responsibility and facilitate the service problem greatly, to the benefit of himself, as well as the dealer and the manufacturer.

The facts that should be driven home to him are that he is alone responsible for five commonly neglected features of motor truck operation, which are: Lack of regular inspection, lack of intelligent lubrication, loose nuts and bolts, overloading, overspeeding.

It is impossible to over-emphasize the importance of these matters which are beyond the control of the manufacturer and which the user must recognize to be in the nature of an obligation on his part deserving of the most careful consideration, if successful operation is to be maintained.

The manufacturer provides an efficient machine capable of successful operation for

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a period of years but when the truck is installed the responsibility passes to the user, as in the case of any other practical utility which cannot be of infallible construction.

The manufacturer and dealer are interested in the most efficient and economical operation of the truck, but a full measure of co-operation is necessary on the part of the user, who should avail himself of all facilities provided by the service station.

There is no reason why the user should not bear his rightful burden of responsibility, nor do we believe he will fail to do so, if we show him the way.

Street Cars Prove Failures as Carriers in Lancaster, England

The Lancaster, England, Town Council on October 29 discussed a report of the tramways engineer as to the cost of substituting petrol omnibuses for the present electric tramways. Councillor Smith said that Lancaster was never suitable for trams, and would never make a tramway system pay. He recommended electric 'buses in preference to petrol 'buses. Councillor Bell mentioned that since the tramways were inaugurated $225,000 had been paid from the rates to meet annual losses. Moreover, on every unit supplied to the tramways there was a loss of 1½d. The present capital of the tramways was $117,250. According to the engineer's report, $67,500 could be realized by sale. To put the system in order would cost $125,000. Ten new 'buses were estimated to cost $95,000, but he recommended a more suitable type at a less charge. The report was referred to committee for consideration.

Trucks Are to Share Space with Passenger Cars at Brooklyn Show

Announcement is made by the Brooklyn Motor Vehicle Dealers' Association that the Ninth Annual Brooklyn Automobile Show will be held in the Twenty-third Regiment Armory during the week of February 14 to 21. This announcement followed a meeting of the association held at the Long Island Automobile Club at which Clifford M. Bishop was elected president of the association. The other officers elected are Chester J. Maxson, vice-president; Fred Kengetter, second vice-president; I. C. Kirkham, treasurer, and W. A. Sellon, sceretary.

For the first time in the history of the Brooklyn automobile show both passenger cars and motor trucks will be exhibited on the floor of the armory during the same week. The passenger cars will be arranged in the center of the armory, while motor trucks will occupy the spaces on the sides of the interior. This combined exhibition of passenger cars and motor trucks is made possible by the exhibitors cutting down the size of their spaces.

Another Livery Stable Gives Way to Garage Filled with Iron Steeds

John Cherry, Jacksonville, Illinois, who has for twenty years operated one of the largest livery barns in Illinois, has converted the plant into a modern garage and has disposed of all of his horses. The rehabilitated plant is located at the corner of Main and North Streets and is one of the few that held to the equine traditions.

Plan $1,000,000 Rolling Grocery Concern

Memphis Firm Will Use Fleet of 50 Motor Trucks for Movable Salesrooms

UNDER a capitalization expected to be placed at $1,000,000, a new grocery concern, consisting of a huge warehouse and about 50 motor trucks to be used as movable salesrooms, with regular routes over the city, is being planned by two Memphians, L. M. Hall, veteran merchandise broker, and Charles T. McManus, lumberman.

Under the name of the Economy Storette, which, as well as the system used, has been patented by the two originators, the movable grocery stores probably will be in full operation by early spring, each motor truck delivering a complete stock of groceries to a certain part of the city on regular schedule. Through the medium of a large number of motor trucks, the entire city will be covered by the rolling salesrooms.

Arrangements have been started with several automobile firms for the purchase of machines by Messrs. Hall and McManus. The motor trucks will be of 3-ton capacity each. Arrangements are being made also for the fixtures to be installed within the bodies, in which to hold the assorted stock of groceries and for warehouse facilities.

The company, when ready to start operation, will equip a large wholesale warehouse with groceries and keep a full line of goods on hand constantly with which to replenish the motor truck salesrooms.

The machines will be fitted with fixtures that will enable them to transport stock to equal the amount carried by the usual small grocery, according to the originators. Approximately 30 shelves, divided into various compartments, will form the upper fixtures on each side of the interior of the bodies. These shelves will carry canned, carton and bottled goods of every variety.

Beneath the shelves will be placed five large sliding bins, to hold flour, meal, sugar, coffee and rice, while at the back end, on each side, running from top to floor, will be compartments for ice, butter, cheese, eggs and poultry, meat and game. The company will not endeavor to transport fresh meat at the beginning, but will confine its efforts along this line to salt and tinned meats, etc.

A demand for fresh meat will be met by movable butcher shops after the fashion of the groceries.

It is claimed that from $1,000 to $2,500 worth of groceries can be carried in a single machine at one load.

By the use of the motor truck salesrooms the originators maintain that the cost of upkeep of a grocery is cut to a lower minimum than it has heretofore been done, which will enable the current prices to be reduced to a greater extent. The chauffeur will act as salesman and cashier as well as driver, and he will wait on customers and take orders for next day. The firm will be run on a strictly cash basis.

At the end of each body between the butters-eggs-meat compartments, will be left a small space in the center that will accommodate five or six persons. Before them will be hinged a counter, over which the chauffeur will sell the goods.

The rolling stores will be started from headquarters each morning at certain hours, and will be at certain stipulated places on their respective routes at the same hour each day. They will be restocked with groceries before leaving. Upon arirving at the "stopping places," which, according to the originators of the plan, will probably mean street corners, or stations to be designated, the sirens with which the machines will be equipped will sound a cry of announcement.

Housewives and other customers will then make their purchases, with the chauffeur abandoning his wheel for his stand in the aisle between the shelves. The company plans to operate the business on a most sanitary scale, having provided roll-tops and locks for the shelves and locks for the bins.

Extra space will be biult on top of each body for surplus groceries, with which to replenish the shelves or bins temporarily. In case of a complete exhaustion of a certain food, the motor truck will he resupplied by service cars to be operated for that purpose by the company.

If the novel idea proves successful in Memphis, the firm will enlarge its capital sufficiently to place stores in operation in other cities of the United States.

English, Great Insurance Gamblers, Take Kindly to "Premier" Policies

The importance of comprehensive insurance to users of commercial motor vehicles can not be overestimated, according to the English way of thinking. A small concern may easily be doomed by an unfortunate accident involving damage to life or property—perhaps both—if the precaution of insurance has not been taken. In this connection, interesting policies known as the "Premier" are being issued at Lloyd's. They include a special policy for commercial motor vehicles covering third-party indemnity, accidental damage, fire, burglary, and theft.

Premiums vary according to certain districts—the more thickly populated the district the higher the premium. Premiums are arranged for delivery vans from 10 h.p. to 40 h.p., with a special policy for Ford vans. Steam wagons and lorries are classified from one-ton to six-tons carrying capacity. There is also a policy for private-hire vehicles. Additional small premiums cover personal accidents to owner or driver, workmen's compensation, etc.

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Trucking in Jura Mud and Snow

Motor Trucks Made Fine Record in Mountain Lumber Camps Until Roads Wore Out and Snows Came, Then Giant Tractors and Trailers Took Up Work

OF course the war is over and we ought to be willing to go on about our affairs and forget it. But the doughboys still tell about their hard times, and we who had to remain behind the front and make lumber, while Heinie bombed us by night when our boiler fires showed him the place, we still enjoy talking about the way we got the logs out of the woods and the lumber to rail junctions. And if we give credit where it is due we must mention the motor trucks, tractors, and their staunch followers, the trailers. For among the scores of logging and milling operations carried on by American engineer troops, there scarcely was one which did not possess and use constantly several motor vehicles of one kind or another. We might go farther even than that and state that there was not a camp that did not keep under constant work several motor trucks or tractors.

The Jura Mountains of eastern France are at once the most attractive and difficult of all the forest regions from the American standpoint. The timber, fir and spruce is splendid beyond anything else in the land. And the country is rough and hilly also beyond compare. So that when our troops landed there in the fall of 1917 they were filled with mixed emotions and began to wonder how in the world they would get stuff enough to their mills to keep them going. There was a narrow-gage railroad running down from one mill to the main line, so that they felt that the lumber would go out all right. But as a matter of fact the French narrow-gage could not handle the traffic, and so in one case at least they were logging from the woods and carrying lumber away by motor truck and tractor.

There were good roads through the country, connecting the small towns one with another. Usually they were well-built enough to stand much traffic, but of course after several months of continued motor truck hauling and no repair work, they became rather the worse for wear. To each main highway there were several feeder roads, often built of rock underneath, but surfaced with dirt, and these arteries were first to give way under the weight of logs and lumber. The forests being accessible in point of distance, the roads naturally were looked upon as natural routes for bringing logs to mill, and as the mills always were from a mile to several miles from any one stand of trees, this meant that some agency was required for their transportation. Trucks were available after a few weeks, both American machines and British, and during the good weather of fall they did very well.

BUT one fine day the Americans awoke to see the ground shining under six inches of new snow. They went forth and put chains upon the motor truck wheels and got along quite well so long as they stuck to good roads. But there is a limit to all things, and soon it became evident that snow and poor roads were not adapted to the ordinary four-wheeled motor truck unless very light loads were carried. Truck-type tractors still could be used with fair success, for they went slowly with heavy chains on the wheels and remained in the roads in spite of mud and snow. They were kept in use on the lumber hauls after the French railroad failed to meet requirements, and for many months they took loaded trailers down to the main line rail junction. Trailers were necessary, and in fact they were the salvation of the sawmill enterprise throughout that first winter. And out in the woods, where the ground was soft except when frozen hard or rather was in an alternating condition of hard and soft, the caterpillar tractor came into its own. Very heavy and strong trailers were used, and upon them the lumber jacks would pile tons of fir and spruce logs. Then the driver got under way and trundled long toward the mill at a speed of from three to five miles per hour. Spare trailers were used, so that when one string was on the way to mill another would be lined up beside the rollways in the woods. Thus one heavy tractor and a dozen good trailers kept a big mill in operation. And on the lumber end, three truck-type tractors were kept in commission, hauling their trailers down to the junction. The distance was longer here and more motor equipment was necessary.

In picking men to handle these machines the officers depended upon character and general intelligence rather than upon any vocally proclaimed ability as mechanics. When a new machine came in and was turned over to the commanding officer he singled out some man who appeared to be the best material, and if he was a novice at driving anything but pleasure cars, he was sent out with the driver who delivered the machine to learn its nature and temperament. Then he ventured forth on his own responsibility, and the motor sergeant, who was found in every camp, watched him for a while. If the captain's choice made good he was given a helper and put in full charge of the machine.

ALMOST any American can learn to drive a motor vehicle in a very short period of time. If he has mechanical ability he soon becomes an expert at keeping it in trim. And although naturally motor trucks and tractors are more difficult of operation than pleasure cars, they are not impossible. In fact, our experience proved that the man who has no fund of previously learned ideas often makes the very best of drivers. He takes pride in his machine and is willing to spend time upon it, for he develops in skill as he tinkers with it. There were comparatively few stops in the repair shops for these machines. Such rules as were made from time to time were results of actual experience as to what was best practice, and the men were glad to observe such instructions as might be promulgated, as they usually were the authors.

Grease and oil were used in abundance, so that the wearing parts were kept from going to pieces as long as possible. In France this was of prime importance; lubricants were plentiful at all times for the army, but spare parts were hard to find oftentimes, and moderation was a positive virtue because it meant longer service. Speed-fiends had no life-tenure of jobs as drivers for the logging corps; they lasted only until they were discovered. Each camp had its motor squad, supervised by a skilled man who had made good in the

Tractor with trailer train on soft ground.

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captain's estimation before he got his job as boss, and this sergeant was in charge of general upkeep and operation. So long as a man delivered the goods he was left to manage his machine to suit his own mind, but when he began to lag and get careless he went back to his cross-cut saw or lumber pile and gave way to another. Fortunately there was very little need of changing men. The motor squad was a proud gang and they did not intend to lose their jobs.

Mud and snow are not good conditions for the making of record runs. There always is the possibility of a wreck before the drivers, and the grooming required under such conditoins adds much to the actual manual labor involved. Every night the running gears and exposed parts must be cleaned and wiped to prevent freezing on of grit and ice. But this labor is worth while, for it means getting to work in the morning without exasperating delays. A steam hose followed by cotton waste and grease at night beats the same treatment when the thermometer is down to zero in the morning.

There were many mills in the Jura, and they operated under several peculiar circumstances. The timber was big and bad to handle, the snow sometimes piled up to a depth of six feet—when of course shovels were needed on the roads and snowplows as well—and Heine occasionally dropped his compliments into the camps. But through it all the tractors delivered the goods, working whenever they were called upon. They often were obliged to push the snow-plows several miles before they could go after logs, but in that work they could not be beaten. And the mills kept sending lumber up to the front and down to the engineer projects back of the lines.

Trucks in Use in Buckeye State Get Special Design in Tag Plates

In no instance will motor trucks be equipped with passenger car licenses during 1920, according to State Automobile Inspector J. C. Vance, of Ohio.

A special plate, with the letter T preceding the number, will be assigned to all motor trucks. There also will be special plates for state, county and city owned vehicles. Mr. Vance said this alteration had been made to do away with the practice of changing tags from one machine to another. "During 1919 more than 510,000 tags have been sold," continued Mr. Vance "and we have made preparations to release 650,000 tags for next year. There will be no increase in the price. In my observations in Cincinnati I have found police to be 'on the job' and enforcing the state automobile laws in a better manner than in most cities."

How Much Weight?

A motor truck weighing five tons is capable of carrying its own weight in useful load. A railroad freight car will carry twice its own weight of cargo. A Pullman sleeper, on the other hand, while it weighs more than a freight car, averages but forty persons or three tons. It costs dollars a hundred pounds of humanity where it costs cents for freight to travel by rail. For two people to travel a mile in an ordinary touring car costs 15 cents each. To haul their weight in a loaded motor truck the same mile costs about 2 cents, or one-fifteenth as much. The reason is all to be found in the relative amount of weight in expensive machinery which is required a hundred pounds of load.

Hauling lumber out of Jura Mountains.

Indiana Truck Corporation Not To Establish Factory Branches.

The story, published in the December number of Power Wagon, to the effect that The Indiana Truck Corporation "has consummated plans which will mean the opening of direct factory branches in every city in the United States" proves to be untrue. It is not the policy of The Indiana Truck Corporation to distribute its product through factory branches and Power Wagon is glad to make this correction.

Parts Makers' Versatility

The accessories applicable to the automobile are now numbered in the hundreds; and their industry represents millions and millions of dollars invested, and hundreds of thousands of people employed. Exact figures cannot be given because of manifest statistical difficulties in measuring an industry which is so complex and so broad in its ramifications. One of the new members just elected to the Motor and Accessory Manufacturers' Association, for instance, is the largest dental supply manufacturing company in America. Another large company belonging to the association is a well-known shipbuilding concern; still another makes phonographs and billiard tables; yet they all make parts and accessories for the automotive industry. In addition to about 130 members exhibiting parts and accessories at the New York passenger show, and 115 at the Chicago passenger show, close to forty members of the association will have space at the two big motor truck shows.

5-tonners Fit Coal Jobs

Coal dealers who have used 5-ton motor trucks and have tried machines of smaller capacity almost invariably declare in favor of the larger unit. The experience of the Milwaukee-Western Fuel Company, of Milwaukee, Wisconsin, which operates thirty 5-ton motor trucks and five 2-tonners, is a case in point. During August, 1919, a typical month, the average mileage for 11 motor trucks used in retail delivery was 849. Just 984 tons were delivered in 202 trips during this period. Contrasting this is the performance of the 2-ton units engaged in similar delivery. Although the average 2-ton motor truck traveled 149 miles more during the month, only 454 tons was the average delivery—a quantity less than half that delivered by the average 5-tonner.

Rainier Dealers Move

The Scott Motor Truck Company, Brooklyn distributer for Rainier motor trucks, has removed to larger quarters, having rented the Sunshine Garage at Atlantic and Classon Avenues, Brooklyn. The change was made necessary by rapidly increasing business. The new establishment provides excellent showrooms, also large service station and parts stockroom. The location is one of the most central, and is right in the heart of the automobile district. The president of the company, Walter A. Scott, is an old motor truck man with many years' experience in the business, and has surrounded himself with an organization of unusual energy and ability, so much so that this firm has within a year sprung into foremost rank among motor truck dealers in Brooklyn.

The Philippine Islands as the source of America's future crude rubber supply is predicted by foresightedness of the rubber industry. In a recent statement, F. A. Seiberling, president of the Goodyear Tire & Rubber Company, declared that if importation of coolie labor was allowed in the Philippines, enough crude rubber would be produced to make America independent of relying on importations from other countries.

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Tractor Market Revealed at Lincoln

English Farmers Said to Be Prospective Buyers for 50,000 Machines Within Five Years; Supply at Home Is Very Short

THE recent International Tractor Trials held near Lincoln, England, marks an epoch in the history of power farming machinery in British agriculture. This demonstration was held under the auspices of the Society of Motor Manufacturers and Traders and was not only the first tractor demonstration of great importance that has ever been held outside of America, but represented the first organized effort to establish these trials in England as a yearly event.

During the war the tractor industry in Great Britain was not carried on through the usual commercial channels. The distressing scarcity of farm labor, the diversion of horses to war uses, and the abnormal demand for food made power farming a vital national problem and brought the distribution of power farming machinery almost wholly under government control. In addition to the tractors supplied by the English factories, a large number of American machines were shipped into the British Isles during this period and distributed among farmers through governmental agencies. This imperative war measure prevented the most scientific distribution. It was impossible in many cases to give proper consideration to each individual requirement. The need was urgent. It was necessary to press into service all available equipment. The problem was to get greater production—get it as quickly as possible—get it irrespective of cost—and the relation of the size or type tractor to the farm on which it was to operate was often a secondary consideration. Under such conditions it is not surprising that many tractors did not show up quite so well as they might have done under normal conditions. But the British farmer is not discouraged. On the contrary, he is keenly alert to the necessity for modern methods. He has learned from the war just what a tractor can be made to do. He sees an urgent need for tractors and he realizes they have come to stay. The time is past when it is necessary to demonstrate to him the advantages of the tractor on the farm. He knows that he must have one. His problem has resolved itself into a matter of decision between the many types and sizes of machines on the market and to determine which machine is best suited to his requirements. The proper choice of a tractor is particularly serious at this time because a mistake might mean spoiling a year's work on the farm—a year's work that not only Britain but the whole world can ill afford to sacrifice.

THE object of the Lincoln Tractor Trials was to enable the farmer to see first hand tractors and implements of different kinds and types doing actual work under everyday conditions. The tests were conducted on a purely constructive basis rather than in a spirit of contest. It was the aim to bring out the diversity of uses to which a tractor could be put and to emphasize the respective merits of different machines for different classes of work.

The organization of the trials was worked out on a unique and unusually efficient basis. Although they were held under the direct auspices and business management of the S. M. M. & T., the farmers' viewpoint was adequately represented, the S. M. M. & T. having invited the National Farmers' Union, the largest and strongest organization of its kind in Great Britain, to select a committee from among its members to collaborate with their consulting engineer, George W. Watson, and his corps of technical assistants.

The judges appointed by the National Farmers' Union were all well-known farmers and men of extensive practical experience. It was their duty to watch at all times the performance of the machines. In additoin to this, an official observer was appointed to follow each machine during the time it was operated. These observers were provided by the entrants and were carefully chosen for their mechanical ability and knowledge of power farming. In all instances they were assigned to competitive machines. For example, the Titan was under the observation of a Glasgow representative and the Glasgow was observed by a Moline man, etc., etc. These observers made their reports to the Engineering Committee and such data was an additional influence in the preparation of the official report. Hence, this official report of the trials will enable the farmer to check his individual observances in connection with an unbiased engineering and practical viewpoint before making his final choice.

In sptie of the decided possibility of a railroad strike, the attendance was much larger than had been expected, running as high as 15,000 on several days. It is estimated that fully 75 per centum of this attendance were farmers, practically all of whom were financially able to purchase tractors. These farmers came from all parts of the British Isles, practically every district in England, Scotland and Ireland being represented. Obviously, these men who had come so far to witness the demonstration represented potential business, and the intense interest manifested by them at the trial grounds certainly substantiated this.

A TOTAL of 53 tractors, including 28 different makes, participated in the trials. There were fifteen American models: Avery, Cleveland, Emerson, Fordson, Galloway, G. O., Gray, Illinois, Mogul, International "Junior," Titan, Moline, Waterloo Boy, Wallis "Junior," Whiting Bull. Sixteen English models: Alldays, Austin, Blackstone Wheel Type, Blackstone Crawler Type, Clayton, Crawley, Eros, Glasgow, Mann, Martin Wheel Type, Martin Crawler Type, Maskell, Omnitractor, Pick, Saunderson, Weeks; and one Italian model, the F. I. A. T. French tractors would undoubtedly have been represented had it not been for the fact that the demonstration at Senlis, France, was scheduled for the following week.

As compared to our recent Wichita demonstration, where approximately 200 tractors were demonstrated, the Lincoln trials were limited as regards number of tractors. This very fact, however, enabled the farmer to get a much more thorough idea of individual performance of each machine. The farmer interest as manifested at Lincoln and the educational

(*Continued on page* 83.)

Typical English threshing scene.

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1. *Two-ton Garfrod owned by Cincinnati Moving Company of Cincinnati, Ohio, has run 14,000 miles on "NOBBIES."*
2. *White, 1½-ton truck owned by Summerfield Company has averaged better than 15,000 miles on "NOBBIES" in and about Boston, Mass.*

NOTHING has done more to increase the popularity of 'NOBBY CORDS' than the downright effectiveness of general hauling.

The moving van industry—sold forever on 'NOBY CORD' cushioning power, plus economy, have forwarded these compliments—"The Cincinnati Moving Company's two-ton Garford is riding on the original air of a year ago. These tires have no less than 14,000 miles to their credit and have reduced our upkeep 30%.

Quoting the Summerfield Company—" 'NOBBIES' on our 1½ ton White have given us better than 15,000 miles and never off the rim; we recommend 'NOBBIES' to our friends."

If your trade is looking for real economy in hauling, inform them that—

"Nobby Cords" Save in Every Phase of Truck Operation

Please mention "Power Wagon" when writing to advertisers.

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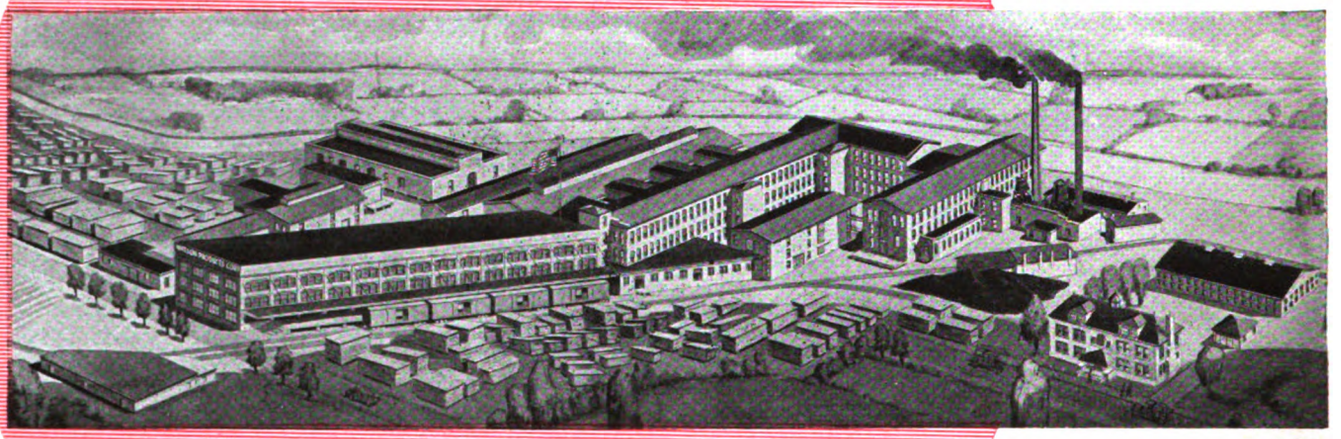
WATSON Haulage



Six Letters and a Series of Factories

ONLY six simple letters spell a name—"Watson"—while the main manufacturing plant bearing that name embraces twenty-one separate buildings, 216,564 square feet of floor space, two miles of railroad siding and 15 acres of ground.

Yet the Name is the greater of the two!

When a man buys a Watson truck, admittedly he buys a physical hauling unit, but he buys MORE.

When a dealer signs a Watson contract, admittedly he agrees to sell physical trucks, but he agrees to sell MORE.

A factory can be destroyed; but a name that for years has been associated with Quality, Service and Square Dealing cannot.

And it is the name "Watson", applied to haulage systems, that you are offered—and all that goes with it.

Write for particulars.

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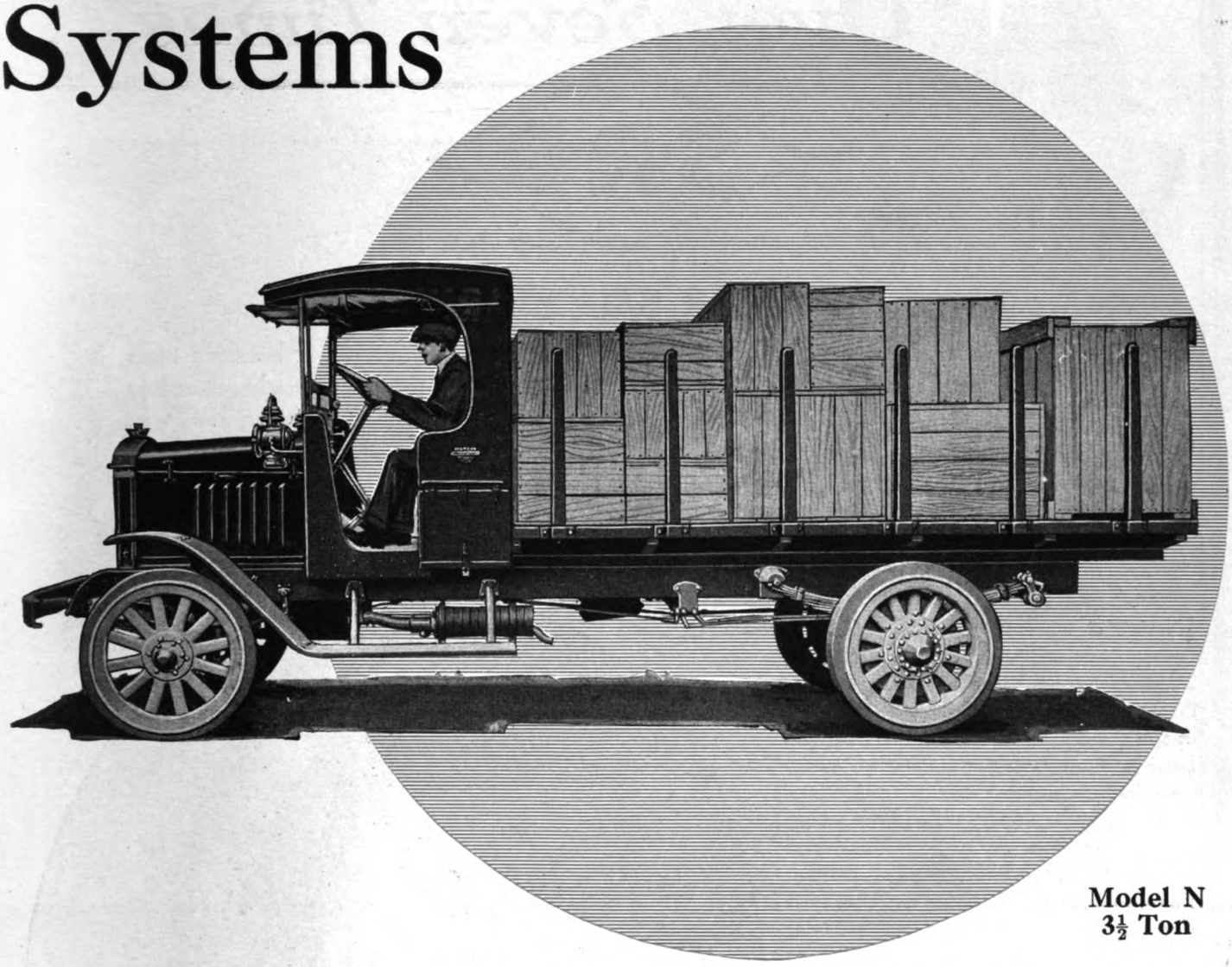
WATSON Systems



Model N
3½ Ton

National Advertising a Permanent Policy

BOTH the User and the Dealer are naturally interested in Motor Trucks and allied lines that are well known—and both are aware that Advertising helps bring this about.

Whereas many concerns adopt Advertising as a Policy of Expediency—using it spasmodically, or as conditions "seem to warrant"—Watson has embraced it as a Fixed Policy of Business Building.

When you deal with Watson you deal with a thirty-one year old Institution that will continue to GROW.

Write for particulars.

Watson Products Corporation, Canastota, N.Y.

WATSON
HAULAGE SYSTEMS
MOTOR TRUCKS
ROAD TRACTORS
DUMPING WAGONS
& TRAILERS

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MR MARLIN-ROCKWELL INDUSTRIES MR

Production Multiplied Over Seven Times

SRB

Single Row Double Row

ANNULAR BALL BEARINGS

BY January, 1920, capacity of production of S. R. B. Ball Bearings will be seven times as great as in January, 1919, at which time production had been already restored to a normal and satisfactory basis after the curtailment of manufacture during the war.

STEP by step in anticipation of the fast mounting requirements of automobile, truck, tractor and other industries, S. R. B. production has been and is being aggressivly brought up, as results of improved facilities, plant extensions and increased equipment. All this with every care to maintain the quality which has made S. R. B. Bearings integral parts of those passenger and commercial vehicles and tractors whose names are instantly thought of as leaders in their respective fields.

IN view of the great proportions which the manufacture and sales of S. R. B. Bearings are assuming, it has been determined to combine the various properties engaged therein into a new company to be known as Standard Steel and Bearings Incorporated. This company consolidates into one operating unit the Braeburn Steel Company, Pittsburg, where all the High-Chrome-High-Carbon Steel for S. R. B. Bearings is made; the Standard Roller Bearing Company, Philadelphia, and the Plainville and other New England plants which are producing and being brought into production on S. R. B. Bearings.

STANDARD STEEL AND BEARINGS Incorporated

Standard Roller Bearing Company

Braeburn Steel Company

Owned and Operated by

MARLIN-ROCKWELL CORPORATION

Executive Offices:

347 MADISON AVE. NEW YORK

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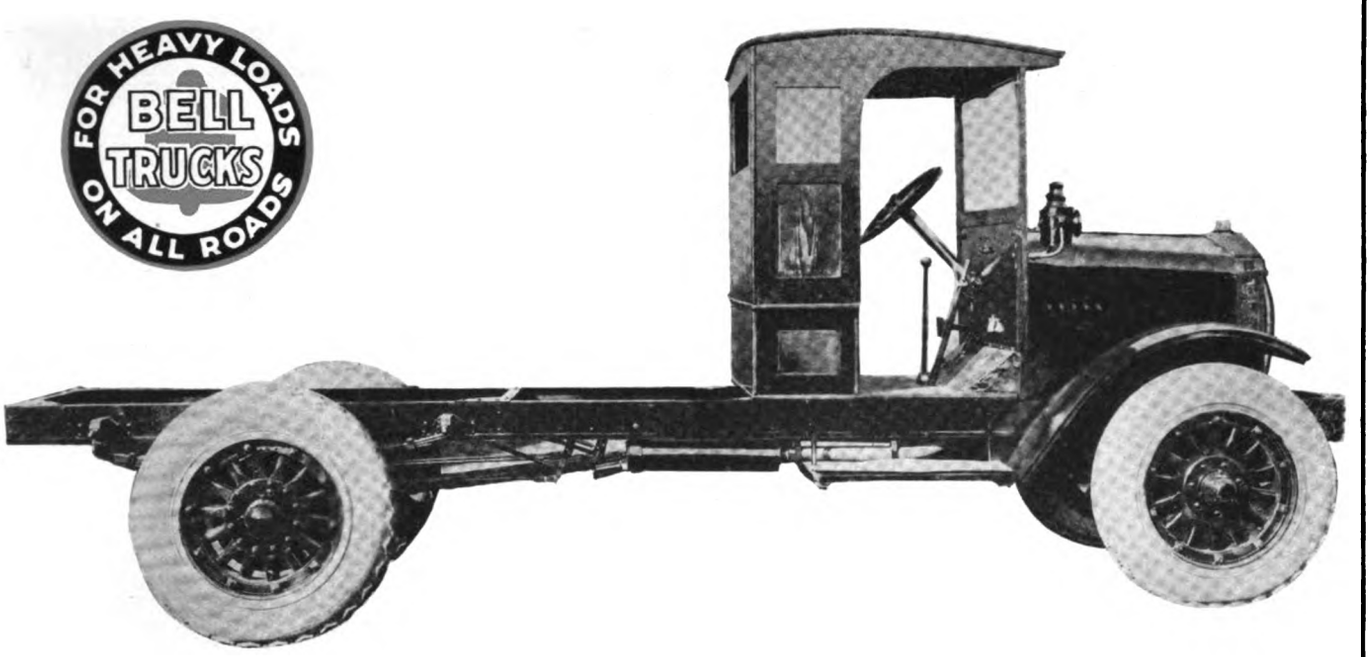

BELL TRUCKS

Ruggedness, Serviceability and Power

are embodied in the Bell Truck.

These qualities enable it to give to the user the lowest cost *per ton mile.* And the Bell Truck can do it every day in the year.

With its extra power and sturdy construction it can deliver maximum loads at minimum cost.

Dealers who want dealer mastery want the Bell Agency.

Write for particulars.

Iowa Motor Truck Company

OTTUMWA **IOWA**

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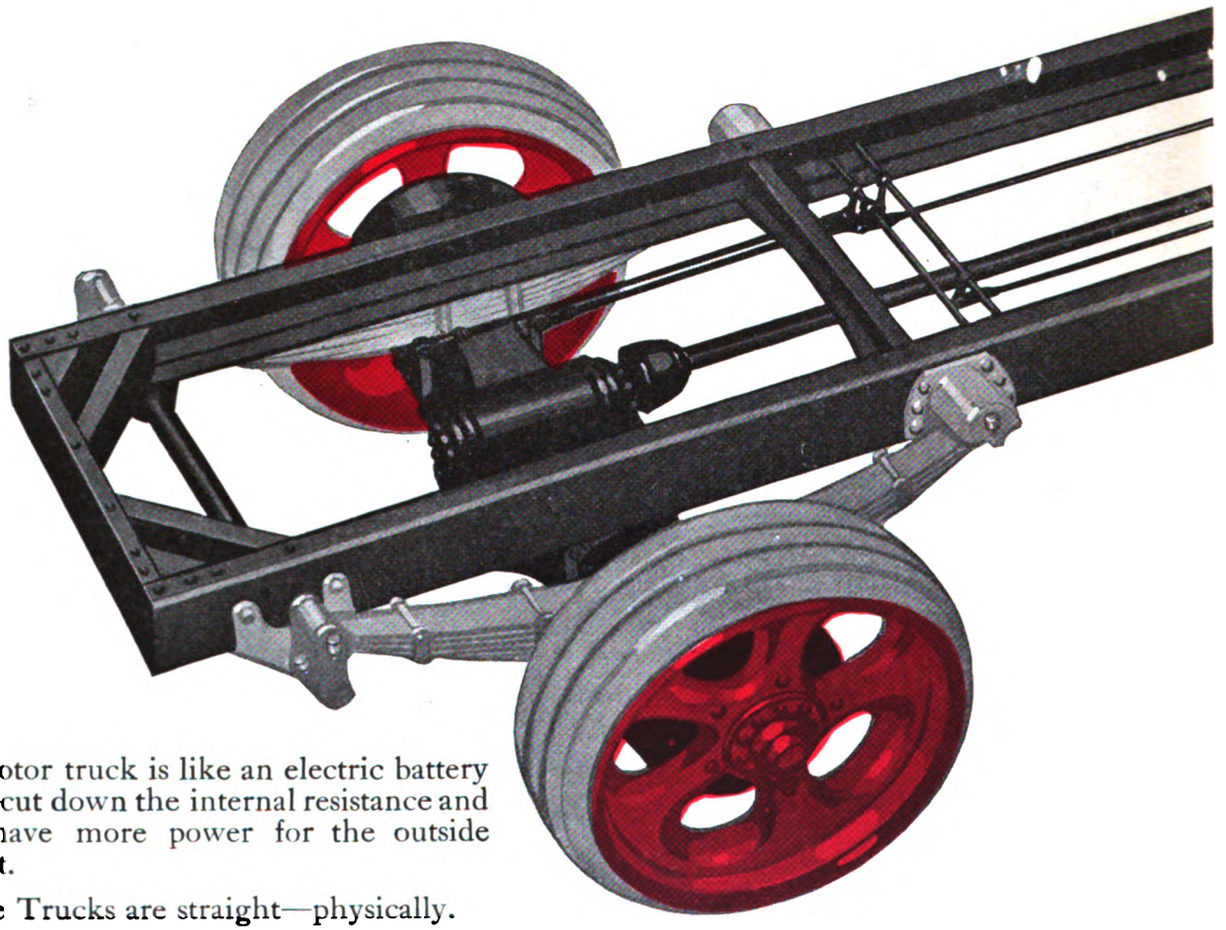
Ace MOTOR TRUCKS



A motor truck is like an electric battery—cut down the internal resistance and you have more power for the outside circuit.

Ace Trucks are straight—physically.

The frame, drive shaft and brake rods are straight. The power is delivered in a straight line. All the control rods are straight. The cross members are straight.

The straightness of Ace Trucks results in strength positive action, minimum internal power losses, maximum power reaction on the load, ease of control, freedom from accidents and breakage, and longer life.

Before we designed the Power IN we designed the Power Losses OUT

1½-2 Ton $2,800.00
2½-3 Ton $3,500.00

¾ Ton and 3½ Ton, to be announced.

We will exhibit at

8th Coast Artillery Armory, NEW YORK
Section D, No. 3

International Ampitheatre, CHICAGO
Section G, No. 6

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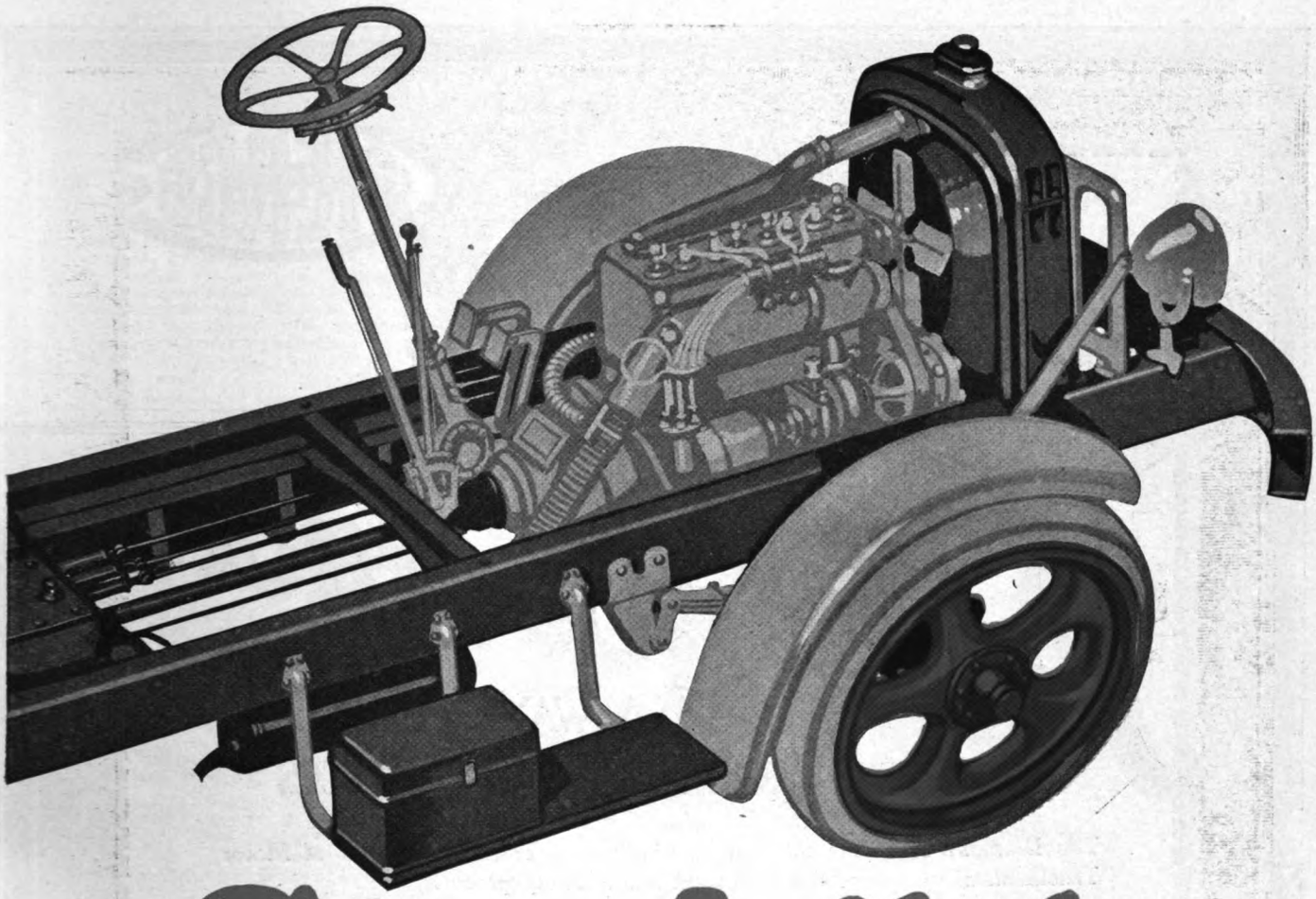

Straight

If all roads were dead level and the load on the truck never varied, universal joints would be unnecessary.

But roads are rough and loads vary, and for these reasons motor vehicles must have universal joints.

Now universal joints—even the best—waste power, by necessity.

There are only two ways to minimize universal joint wastage of power—use the best universal joints, and give them the least possible work to do.

We believe Ace Trucks have the best universal joint—Spicer.

We know Ace Trucks demand the least possible service from their universal joints, because the chassis design is such that when the truck is normally loaded the drive shaft is absolutely straight, from crank shaft to worm pinion. That gives the engine the equivalent of a solid, straight, frictionless, non-corner torque that gets there one hundred per cent strong at the point where the tires track on the ground.

Straight Dealers get a Straight Contract that builds a Straight Motor Truck Business.

Ace

The AMERICAN MOTOR TRUCK COMPANY
NEWARK OHIO.

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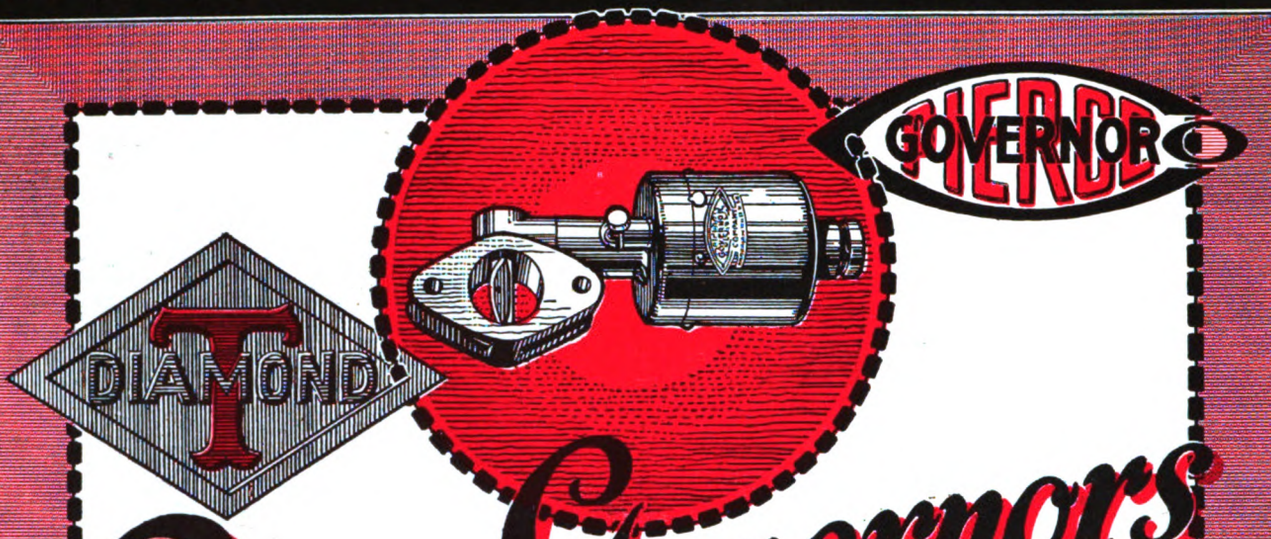


Pierce Governors

ALWAYS LINKED WITH THE BEST MAKES OF MOTOR TRUCKS

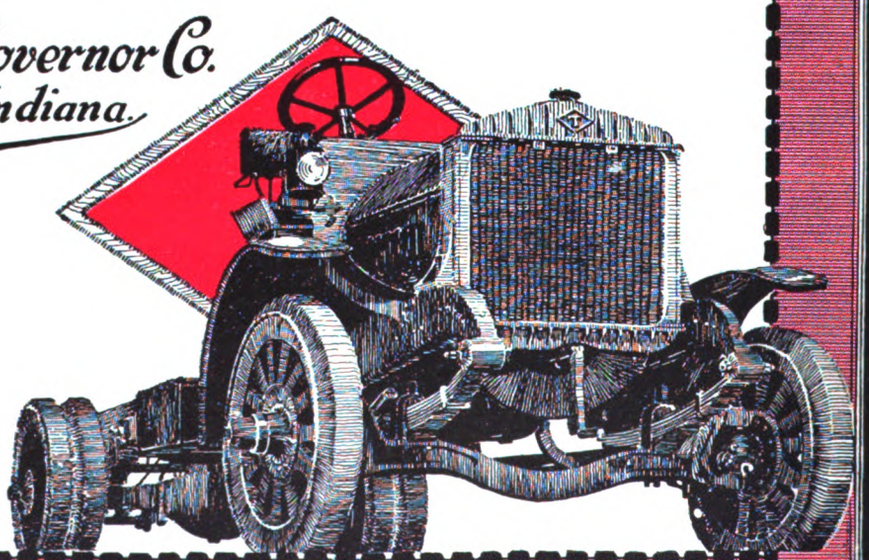
The Diamond T is only one among ninety-nine prominent makes of Motor Trucks on which Pierce Governors are standard equipment.

Truck Manufacturers who let quality and not price guide them in the selection of units for their trucks, do not buy governors until their Engineers have given the different types the most gruelling and exacting competitive tests possible.

As a result of such tests, more Truck Manufacturers are today using Pierce Governors than all other makes of governors combined. Pierce Governors are superior—*always*.

The Pierce Governor Co.
Anderson, Indiana.

WORLD'S
LARGEST
GOVERNOR
BUILDERS



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COMING EVENTS.

Jan. 2—Second Pan-American Financial Conference, Washington, D. C.

Jan. 3-10—Motor Truck Show, auspices National Automobile Chamber of Commerce, Eighth Coast Artillery Armory, New York City.

Jan. 6-8, 1920—Omaha, Neb. Mid-West Implement Dealers' Assn., Auditorium. James Wallace, secretary, Council Bluffs, Ia.

Jan. 7-8, 1920—New York City. Annual Winter Conference, Society Automotive Engineers. Coker F. Clarkson, secretary and general manager, 29 West 39th street.

Jan. 24-31—Motor Truck Show, auspices National Automobile Chamber of Commerce, International Amphitheater, Chicago.

January, 1920—New York City. International Auto Manufacturers' Congress.

January, 1920—Washington, D. C. Pan-American Conference.

Feb. 9-13—Seventeenth Annual Convention. American Road Builders' Association, Louisville, Ky.

Feb. 9-13—Eleventh National Good Roads Show, Louisville.

Feb. 9-13—Meeting Tenth American Good Roads Convention, Louisville.

Feb. 9-14—Tractor and Farm Machinery, Forum, Wichita Thresher-Tractor Club, Wichita, Kans.

Feb. 23-28—Twelfth Annual Exhibition Louisville Automobile Dealers' Association, Louisville.

Feb. 24-March 1—Kansas City, Mo. National Tractor Show, auspices Kansas City Tractor Club. Guy H. Hall, manager, Sweeney building.

Feb. 24-March 1—Kansas City, Mo. Motor Car Dealers' Show, Convention Hall. Passenger cars, trucks accessories.

February, 1920—Chicago, Ill. International Auto Manufacturers' Congress.

February — Fifth Annual Kansas City Tractor Club, Guy H. Hall, manager, Kansas City, Mo.

March 13-20, 1920—Boston, Mass. Boston Automobile Show. Chester I. Campbell, general manager, 5 Park Square.

March and April, 1920—Pretoria, South Africa. South Africa Products Exposition. (Overseas motor vehicles especially features.)

April, 1920—London, England. Olympia Commercial Vehicle Exhibition.

April 3-May 4—Buenos Aires, Argentine. Exposition of U. S. Manufacturers.

May 15-20, 1920—San Francisco, Cal. Seventh National Foreign Trade Convention.

Trucks Cut Lumber Price

The motor truck is keeping down the price of lumber and timber.

This was the opinion of delegates to the Southern Logging Association's convention held in New Orleans. With the present price of horse, mule and ox feed, it is hard to estimate what a saving the motor truck is to the lumber men, it was stated. The subject of the motor truck, the tractor and the spark arresters was discussed by leading Mississippi and Alabama lumbermen.

Selden Trucks Pay Dividends

At a meeting of the directors of the Selden Truck Corporation, held December 1, 1919, the regular quarterly dividend of 2 per cent on the first preferred stock of this company was declared payable January 2, 1920. The regular quarterly dividend of 2½ per cent on the second preferred stock was declared payable on January 2, 1920. The books of the company closed on the evening of December 16, 1919.

Decatur Has Association

The Decatur, Illinois, Automobile Trade Association has been organized and temporary officers chosen. Twenty-five dealers have alined with the new body. The directors are W. C. Starr, who is also temporary president; Lee Hayes, W. L. Shellabarger, Daniel Bopp and B. B. Burns. Permanent officers will be chosen at a subsequent meeting, at which time a constitution and by-laws will be adopted.

Lays Bollstrom Cornerstone

City officials and many citizens paraded St. Louis recently in the ceremony at the 40-acre site of the Bollstrom Motor Truck Company, where the cornerstone of the new $300,000 factory was laid. Mayor Donald Kemp, assisted by C. A. Resle, president of the board of trade, introduced the speakers, including W. A. Collins, Bay City; A. A. Bowman, Akron, Ohio; C. W. Gibbons, St. Louis, and others.

Gresslee with Rainier

Charles H. Gresslee has just been appointed district manager for the Middle West for the Rainier Motor Corporation of New York City. His territory extends as far west as Omaha. Mr. Gresslee is well known in automotive circles and enters into his new duties with enthusiasm. He says he has a fine little motor truck and a still finer territory, just bristling with opportunities.

EXPORTS OF AMERICAN MERCHANDISE

Compiled from the monthly reports issued by the Bureau of Foreign and Domestic Commerce, Department of Commerce, Washington.

ARTICLES AND THEIR DESTINATIONS	JULY				SEVEN MONTHS ENDING JULY			
	1919		1918		1919		1918	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Animals.....no	**1,922**	**$157,574**	**3,090**	**$571,148**	**13,257**	**$1,791,412**	**42,487**	**$7,883,934**
Horses	1,796	135,820	2,966	549,208	9,780	1,298,430	34,145	6,364,042
Mules	126	21,754	124	21,940	3,477	492,982	8,342	1,519,892
Farm Tractors.....no.	**2,913**	**1,207,223**	**4,944**	**2,072,634**	**39,088**	**16,344,719**	**36,719**	**19,622,505**
Internal—comb	2,874	1,166,783	4,910	2,023,578	28,563	1,681,872	36,015	18,697,250
Steam	39	40,480	34	49,056	525	662,847	704	925,255
Gasolene.....gals.	**18,873,543**	**$4,429,864**	**33,334,164**	**$8,267,463**	**143,409,870**	**$34,483,052**	**186,917,565**	**$45,458,164**
Motor Vehicles.....no.	**5,584**	**7,148,749**	**4,043**	**5,132,389**	**40,038**	**55,872,870**	**31,541**	**37,910,291**
Motor Trucks.....no.	905	2,173,303	601	1,527,519	8,413	20,742,825	5,508	13,705,235
Argentina	7	30,662	1	3,250	75	170,081	43	39,863
Canada	135	235,279	103	165,083	1,002	1,492,434	804	1,007,714
Cuba	69	158,981	38	78,057	470	1,027,013	316	648,355
France	162	799,532	128	503,802	2,423	10,464,677	1,459	5,412,496
Russia in Asia	4	1,250	.....	.....	5	5,050	.....	.....
Russia in Europe	.....	.....	.....	.....	.....	.....	.....	.....
United Kingdom	12	18,443	184	547,677	64	123,409	1,616	4,757,638
All others	516	929,156	147	229,650	4,374	7,460,161	1,268	1,833,715
Passenger Cars	4,679	4,975,446	3,442	3,624,870	31,625	35,130,045	26,033	24,205,056
Argentina	45	70,603	150	230,125	1,120	1,446,072	1,219	1,194,409
Australia	120	123,278	460	425,443	1,845	1,830,659	2,704	2,203,861
British India	265	270,424	4	6,000	954	1,056,905	49	33,498
British So. Africa	184	211,421	.....	.....	1,169	1,409,054	664	539,619
Canada	612	662,548	357	281,916	5,118	4,959,381	7,274	5,960,916
Chile	7	9,348	101	139,053	391	606,145	1,162	1,444,475
Cuba	121	145,635	214	335,912	1,325	1,577,366	1,252	1,678,428
Denmark	434	413,087	.....	.....	1,407	1,563,663	2	4,100
Dutch East Indies	87	105,423	214	273,417	1,308	1,711,735	396	481,372
France	7	25,700	156	111,486	378	1,323,888	664	915,160
Mexico	173	133,930	162	147,120	1,571	1,300,929	1,308	892,399
New Zealand	368	394,166	197	169,529	1,441	1,585,126	976	790,586
Norway	134	233,376	36	92,190	708	1,022,802	47	124,438
Philippine Islands	166	158,558	195	224,996	1,537	1,641,351	1,282	1,071,130
Russia in Asia	.....	.....	.....	.....	38	27,945	.....	.....
Russia in Europe	.....	.....	.....	.....	.....	.....	4	1,720
Spain	52	97,881	87	100,844	539	648,405	436	532,789
United Kingdom	316	303,848	3	8,957	1,065	1,199,408	338	957,197
Uruguay	43	68,996	183	161,221	1,112	1,056,895	1,116	653,787
All others	1,545	1,547,224	923	916,661	8,599	9,162,316	5,140	4,725,172
Motor Vehicle Parts	.....	**$4,664,956**	.....	**$4,719,549**	.....	**$41,863,534**	.....	**$29,942,246**
Engines.....no.	1,852	328,789	3,698	730,772	15,602	2,460,730	19,816	2,617,144
Tires	.....	1,570,017	.....	1,217,584	.....	16,762,495	.....	8,291,483
All other parts	.....	2,766,150	.....	2,771,193	.....	22,640,309	.....	19,033,619

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Orient Offers Tractor Profits

Almost Whole World Is Open to American Makers Who Will Study Foreign Trade Conditions With Object of Opening Market

THE American tractor manufacturer should awaken to the wonderful opportunities to market his machine in Europe, South America, and the Orient. Now is the time that foreign countries are in need of maximum efficiency in food production in order to offset the destruction of war and the deterioration of their agricultural organization through decreased man power.

Siberia, with its wide sweep of country, China, with its fertile valley of the Yang-Tze, Brazil with its rich lands, and France with its farming country still under antiquated forms of cultivation, are all in need of the tractor, in order to bring their agriculture into a state of maximum productivity. It rests with American industry to supply the need and it can do it if a well-organized campaign to secure this business is launched at once.

When the manufacturer has decided to enter the foreign field, he is confronted by an entirely new set of problems. He should make a study of conditions in the foreign countries with which he intends to deal. For example, he should know that it is necessary to take the tractor apart and carry it across the Andes by mule to reach certain parts of South America. If the manufacturer knew this, he would not assemble the tractor completely, but would pack different parts separately for the shipment to some of the countries south of the equator.

ONE of the first things that a tractor manufacturer desiring to build up foreign trade should do is to establish an export office in a seaport city. It should be located in an office as close as possible to the consulate of the country with which he expects to have the closest trade relations. The manager of this branch should be in close touch with the consular representatives of the various countries with which he is dealing.

A problem that the tractor manufacturer must face is that of choosing a competent manager for his export department after he has decided to go in for foreign trade. It is desirable that he should be a man who has traveled through foreign countries and studied the language, business and customs of the people. Another important qualification for the position is the ability to sell and to direct other men in their work. Some institutions make the mistake of apponting men who know little or nothing about foreign countries, for this position. A man should have a knowledge of the business methods of his customers if he wishes to attain a maximum of efficiency in handling foreign trade.

In addition to his account in his local bank, which might be adequate to finance his domestic business, the tractor manufacturer should establish an account with a strong foreign banking corporation that does business in the cities of Europe and the Orient. A banking connection of this kind will enable the manufacturer to investigate the credit of a firm in the Dutch East Indies or Siberia with comparative ease, while it would be a long and tedious process to do it with the assistance of a local bank. Another factor in favor of a big foreign banking corporation is that it has the large capital and surplus necessary to make loans of several hundreds of thousands of dollars, which the smaller institution would not be able to handle even if they desired. It would not be advisable for the manufacturer to close his account with the bank that had financed his earlier undertakings, but it will be necessary for him to deal with more than one bank as he progresses and the extra one that he selects should be one specializing in foreign trade.

THE tractor manufacturer must exercise great care in preparing his products for foreign shipment. An American who was in Australia had a serious complaint to make about the shipping methods of his countrymen. He claimed that he went down to the dock where a ship from the United States had just been unloaded and was forced to climb over parts of sewing machines, brushes, food products and innumerable articles that had become unpacked during the voyage. Every one of these items had been prepared for shipment in a faulty manner and undoubtedly resulted in a long procession of complaints that consumed a large amount of time and resulted in the consignor being the target of bitter criticism. The tractor manufacturer should use heavy boards to keep his shipments from becoming unpacked instead of light materials which will not withstand the rough treatment accorded them by a longshoreman and his grappling hooks.

The countries of South America are excellent markets for tractors made in the United States. One advantage of this as a field is the fact that the seasons are just the opposite south of the equator. The time that our manufacturers are having their dull season would be the busy time for the Latin-American countries. This addition of the export business would tend to make the output of the American manufacturer more stable.

The manager of the export office should make it a point to keep on good terms with the consular representatives of the countries with which he intends to deal. If he does this, he will often find that the movement of his goods will be expedited greatly. If, on the other hand, he incurs the enmity of those men, he may find that his shipments will be held up for reasons for which he can not account.

Many manufacturers have hesitated to enter trade relations with the Orient because of a fear of loss through uncertain credits. If he uses a few precautions, his percentage of loss will be lower in China, Japan and Eastern countries than it is in the United States. The reason for this is the fact that the average trader in the Orient is anxious to build up a good business with the United States and he realizes that he must pay his bills promptly if he is to establish a good credit rating that will insure a quick shipment of his products.

A prominent importer and exporter recently expressed himself as follows: "I have dealt with the countries of the Orient for many years and I have found that a majority of the firms are very prompt and honest in paying their bills. In fact, my percentage of loss through bad accounts is higher in the United States than it is in the Orient."

The American manufacturer will find it profitable to study the needs of the Oriental countries. In fact, it would be advisable to send a man to those countries to study agricultural conditions with the purpose of ascertaining the size of tractor that is best suited to their needs. He will find that a machine must be designed for use on a limited area.

THE tractor manufacturer who wishes to create a demand for his machine in Oriental countries in a short time can do so by advertising. If he wishes to sell direct to the user, he can use billboards and newspapers in foreign countries. On the other hand, if he desires to deal with exporting and importing firms with headquarters in Hong Kong, Kobe, Manila or Vladivostok, he can reach them through the various foreign trade directories and monthly magazines which circulate among the foreign traders in the different countries of the globe. The man who writes this copy must use educational arguments as well as points that will emphasize the superior qualifications of his machine.

The exporter of tractors should be an adaptable type of business man. It is important for him to regulate his business dealings with the Chinese so that he can successfully sell to the hongs, or associations that buy for different classes of firms in that country. It is important that he should train his men to pay attention to the social side of the relation when dealing with the Russians. Now that vodka is disappearing, the Slav likes to drink a cup of tea with a man before he does business.

The tractor manufacturer who organizes a foreign department at once and sends his representatives to other countries will be paving the way for a world-wide business in the future.

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Tractor Market at Lincoln.

(*Continued from page 72.*)

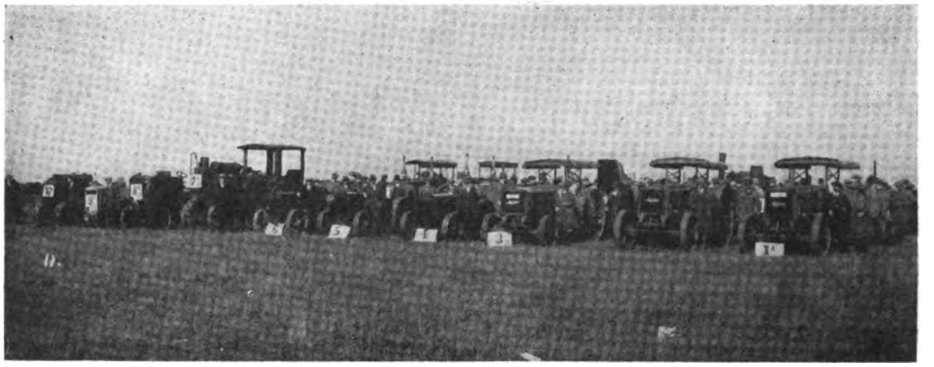
effects of this event bring home quite forcibly the fact that our American demonstrations are becoming too unwieldy to be thoroughly effective.

In marked contrast to the American demonstrations the plowing fields at Lincoln were quite small, the largest being 47 acres and the smallest 9 acres. There were a total of 27 fields. The total acreage was 535, which made the average field only 20 acres. This seems extremely small to us, but it was truly representative of the average British farm. Although this presented an entirely different problem than has confronted us on this side, obviously it was the only fair and practical way to demonstrate tractors to the British farmer. American farms are much larger and American demonstrations have been conducted on a correspondingly larger area—for example. it will be recalled that at the recent Wichita event the total acreage contracted for was 2,200.

One of the requisites for entering a machine was that it must be submitted to a draw-bar test for the purpose of guiding entrants as to how many bottoms might be drawn by the machine, the intention being to have each tractor travel at the uniform rate of 2½ miles an hour and at this speed develop its maximum pull.

In Britain no accurate data concerning soil resistance, etc., had ever been obtained prior to the trials. In scientific power farming such information is of great importance. This was recognized by the committee—in fact, it was one of the primary purposes of the trials to obtain this data.

The problem of the relation of the plow to the tractor was the subject of much discussion at the grounds and was frequently mentioned by the British trade press, not only in the matter of properly hitching the plow to the tractor, but as regards the design of the plows and implements used with the tractor. Instead of turning the furrow over flat as is customary in America, in England, due to the excessive moisture in the soil caused by climatic conditions, it is necessary to turn the furrow on edge for drainage purposes. This requirement coupled with the faster plowing speeds incidental to power farming presents a difficult problem.



Tractors at Lincoln, England, trials lined up for photographer.

Self-lift plows were very much in favor—in fact, the British farmer is keenly appreciative of any improvements in the implement field. The disk harrow, for example, which is a universal favorite in this country, is just beginning to gain favor with the Briton. The British tractors and the American tractors participating in the trials following the same general tendencies in design. With one or two exceptions all of the tractors entered were kerosene burners. The prohibitive cost of petrol or gasolene in Britain makes it a prohibitive fuel.

The English farms which really impress one as beautifully well-kept gardens are exceptionally well equipped with implements, and from all indications these implements receive much better care than they do at the hands of the American farmer. From this it would naturally follow that the very highest developments in farm machinery would find a ready market with the English.

It was estimated that the British farming industry would require 50,000 tractors within the next five years and the government refused to consider an increase of the tariff unless the English manufacturers could guarantee such a production. In this connection the following quotation from the London *Daily Express* is of interest:

"There is a black side to the overwhelming successful tractor trials now in full swing here. The British farmer is here in increasing thousands; he has made up his mind for tractors; he has seen British designed and manufactured machines in practical working competition with foreign makes.

"In three cases out of four he prefers the home product as being the best and most suited for the peculiar demands of British agriculture. He has made up his mind to buy British tractors, but British manufacturers will not guarantee delivery. Foreign makers, particularly American, *will*.

"If the farmer cannot get delivery of British goods he will take foreign-made—*and that means American*. The war has educated the farmer in four years to a point that, with his natural conservatism, he would not ordinarily have reached in fifteen years."

Flat tractor, dynanmometer and typical English plows.

H. D. Wilson Heads H-S

H. D. Wilson has been appointed vice-president of the Herschell-Spillman Motor Company, North Tonawanda, New York, and has assumed the duties of the office, which embrace a portion of the general administration as well as the directing of the distribution of that company's product, including the initiating and supervising of the extensive publicity incident to the large expansion of its manufacturing program. Mr. Wilson has contributed very extensively to the development of the automotive industry, and brings to his new connection a splendid record of service in executive and administrative positions with a number of the most prominent and responsible manufacturers in the trade, dating as far back as 1902.

Durston Gear Enlarges

The Durston Gear Corporation, of Syracuse, New York, has doubled the size and capacity of its already large plant within the past few months. It has also recently brought out a new model transmission. This design represents the most up-to-date engineering and mechanical features. The gears and shafts are nickel steel throughout. The main shaft is mounted on annular ball bearings, and the counter-shaft gear set is of the cluster type, rotating on a fixed shaft. Easy shifting of gears is one of the prominent features of this new model.

"Get acquainted" was the big feature on the program of a four-day sales convention of Martin-Parry Corporation officials, distributers and sales representatives held December 2, 3, 4 and 5.

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Hoosier Truckmen Alive on Job

Indiana Transfer and Warehousemen's Association in Second Annual Convention Discuss Problems of Vital Importance; Members Offer Interesting Opinions on Live Subjects

EIGHTY members of the Indiana Transfer and Warehousemen's Association turned out for the second annual meeting of the organization at the Chamber of Commerce, Indianapolis, on November 29, indicating that the infant organization is rapidly becoming a power in the motor truck industry and will have a voice in future conferences at which motor truck problems are discussed. The organization endorsed the Townsend Bill, now pending in congress, discussed operation costs and legislation of the past and future, and incidentally voiced more than a little criticism of motor truck manufacturers and salesmen, who, members asserted, had done a good deal of harm by spreading suppositious figures of cost which had hurt the entire industry by causing newcomers in the express and transfer business to operate on low, though fictitious basic costs and thus to underbid the more experienced members of the trade.

REPLY was made to this charge by S. S. Merithew, transportation engineering department of the Packard Motor Car Company, of Detroit. Mr. Merithew explained that motor truck manufacturers made motor trucks, not figures, and that the latter must come from users. He warned the motor truck operators from taking too seriously some of the figures they themselves had advanced during the day, and urged them to learn four basic laws of motor truck transportation, which he gave as follows:

1. The cost per day will vary with the miles traveled per day. It will increase as the daily mileage increases.

2. The cost per mile will vary with the miles traveled per day. It will decrease as the daily mileage increases.

3. The cost per unit (for example, ton) will vary with different capacities and the distance hauled. It will decrease with an increased motor truck capacity. It will increase with an increase in hauling distance.

4. The cost per unit-mile (for example, ton-mile) will vary with different capacities and the miles of motor truck travel per day. It will decrease as the capacity increases. It will decrease with an increase in daily mileage.

In arriving at a cost for a given operation, Mr. Merithew said owners should divide their costs into two classes: the fixed cost, including garage bills, repair bills, driver's pay, taxes, etc., which continue whether or not a wheel is moved, and the variable charge, which depends on each operation. Owners are too prone to compare operations of different kinds, he asserted, thus reaching the erroneous conclusion that the cost of a 100-mile trip will be just twice that of a 50-mile journey.

The Chamber of Commerce will shortly establish a cost-school, Tom Snyder, secretary of the warehousemen's association, announced, which truckmen from all parts of Indiana will be invited to attend. Sessions will be held monthly or bi-monthly. Another speaker went on record as favoring such schools all over Indiana, instead of only in Indianapolis.

The keen discussion which took place on operating costs showed that this was a subject close to the hearts of the transfermen, and indicated that the salesman who can throw light on cost systems has an excellent chance to make a favorable impression. Mr. Merithew's talk, for example, was well received, and the literature he distributed was carried away by the association members. The engineer made hardly as favorable an impression when he suggested that the association appoint a committee to audit statements made by *Transfer and Storage*, the trade paper covering that field, with regard to their correctness. His suggestion was received with silence and no one made a move to carry it out in any part. The reception accorded the idea suggests that salesmen had best stick to motor trucks and not attempt to operate the trade press in any given field.

B. J. Bartlett, of the Bartlett Trucking Company, of Huntington, Indiana, spoke on "Cost Systems and What They Mean to This Industry."

"NO man can be successful unless he is conversant with his business," he said: "and no one can be conversant with his business unless he knows his costs."

Mr. Bartlett canvassed his audience and found that about 50 per cent operated two and three motor trucks. Four members operate as many as ten and seven own five motor trucks. About half of the members, however, are what might be called small operators, with two or three vehicles each.

About half of the truckmen have been in business for five years, his questioning brought out. Five of those present had been in the industry for twelve years or more, while 20 per centum of those present indicated they had but a year to their credit in the trade. The 2-ton machine was most popular with the audience, the canvass indicated. While all capacities were represented, the majority utilized the 2-ton. Mr. Bartlett criticized motor truck manufacturers as well as those who make tires and other accessories for too optimistic tone of their advertising.

"The newcomer in the trucking business is led to believe that with the wonderful motor truck made by Jones and the wonderful tires made by Smith and the wonderful service given by Brown, he will never have to spend over ten or fifteen cents for repairs. The ads tell a story which does not compare well with our experience. They cause inexperienced men to charge too little for their services, and thus place the whole industry at a disadvantage in competing for the business."

The speaker asserted that this optimism extended to the life of a motor truck, ten years being the manufacturer's usual estimate, while four years was nearer the experience of the transferman. "My own opinion is that a motor truck four years old is usually almost obsolete and that it is difficult to get parts for it, even if it is all right in other respects," said the speaker. Mr. Bartlett urged the transferman just entering the business to go to some veteran for costs before fixing his prices. "I operate a filling station at Huntington," he said, "and have an opportunity to question transfermen coming through. There is altogether too much variance in their charges. Some of the prices are a crime to the industry, allowing nothing for depreciation or other fixed charges."

J. P. Woodworth, of South Bend, Indiana, said one of his machines had made him just seventy cents a day. His horses, on the other hand, made money for him. Mr. Woodworth explained that it was not the fault of the motor truck, which had stood up well, and done all its manufacturers promised, but the cost of "pull-outs" by farmers and high hotel bills on overland trips.

DUMP trucks were discussed, one owner saying $3.50 an hour was a fair charge for a 3½-ton machine of this type. This operator charges off 25 per centum a year for deprecation. He feels that the depreciation of a dump truck is not as rapid as that of a freight vehicle.

Following an address by Daniel B. Luten, a consulting engineer, the association adopted a resolution urging passage of the Townsend Bill, and ordered a copy of the resoltuion sent Indiana's congressional representatives. Mr. Luten explained that the bill provides for a Federal Highway Commission of three men to supervise state building of roads from the viewpoint of national defense and that the government will appropriate $425,000,000 during the next three years for highway construction. The Indiana Highway Commission has opposed the passage of the bill, it was announced.

Tom Snyder, secretary of the warehousemen's association, and also identified with the highway transportation department of the Chamber of Commerce, announced that the Hoosier Auto Club, of Indianapolis, had formed a motor truck division and was prepared to advise members as to routes over any of adjoining states. The membership fee is $10.

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Speaking on "Highway Transportation," Mr. Snyder asserted that the country has solved production problems, but is an infant in arms as far as any solution to the distribution question was concerned.

"The United States produces plenty of everything and its people can't get it," he said. "The motor truck must bridge the gap between the agricultural producer and the industrial consumer. The motor truck is the answer. Let me tell you that the Chamber of Commerce has been severely criticized for helping truckmen go around the commission man. The transferman of the future must be a jobber as well. He will collect and sell the farmers' produce direct to the grocer, getting a fair margin of profit, though not as much as the commission man now asks and obtains." Mr. Snyder explained how this was being done to some extent now, farmers putting small amounts of produce which would not justify a special trip to market beside the road and the rural expressmen collecting it and selling it.

"Shippers must learn to think motor truck when they have a short haul," said the speaker. "They can afford to pay the operator more than the railroads for freight. We have made a survey of the terminals in Indianapolis and know that properly the shipper should add to his freight charge a big charge for waiting. Almost never can a motor truck get into the terminal freight stations to put off or take on shipments without a long wait. In many instances the machine taking the freight to the depot could deliver it to its destination thirty or forty miles from the city during the time it spends waiting for a chance to unload it. We must educate the shippers to these facts, so that the motor truck for a short haul will be considered a fundamental procedure."

MR. SNYDER deplored the tendency of some capitalists to start into the trucking business without adequate analysis of its possibilities. One firm, he said, announced itself willing to spend $50,000 to establish a motor express line between Indianapolis and Cincinnati. Mr. Snyder advised them that the time was not yet ripe. He urged the association to devote its efforts to get a lien law which would protect members from grafters. Any one can evade payment of shipping charges by motor truck under present conditions, he asserted, since the truckman has no claim on the goods moved.

He announced that the association's legislative committee had been able to secure a reduction to $6 annual tax, effective January 1, 1920, and covering every motor truck using Indiana roads. The legislature at first proposed a tax of $10 per motor truck. "The Chamber of Commerce of Indianapolis," he said, "will spend $15,000 in 1920 to boost the motor truck and provide return loads for vehicles coming into the city."

The point was made in a discussion that operators are considered legitimate prey by the officials of Indiana townships, which have local laws governing the size of motor trucks to run over the roads in winter. The point is not specifically covered by the state law, and operators are frequently persecuted by small-town officials, it was said. Mr. Snyder said that the charge of 1¼ cents per 100 pounds per mile advocated a short time ago had been found too low and that operators should charge about 1½ cents per 100 pounds per mile.

Speaking of "The Crime of Cruelty to Trucks," W. S. Frye, of Indianapolis, urged the members to have a night man on duty at their garages to lubricate the machines. One day mechanic also is necessary, he said, to carefully examine one car daily and make needed repairs. He blamed the bad streets for premature breakdown of motor trucks, not the manufacturers.

The treasurer's annual report showed a deficit.

C. F. Borgman, of Fort Wayne, Indiana, was elected president of the association, succeeding J. M. Hedges, of Terre Haute. Tom Snyder, of Indianapolis, was re-elected secretary, and C. W. Abrams, of Indianapolis, was made treasurer, succeeding L. J. Hadley, of Indianapolis.

The following legislative committee was appointed to secure a lien law and other favorable measures: J. M. Hedges, Terre Haute; J. P. Woodworth, South Bend; Fred Geiger, Evansville; B. J. Bartlett, Huntington; H. L. Oliver, Muncie. One vice-president will be appointed in each of the thirteen congressional districts in the near future. F. L. Bateman, of the Trans-Continental Freight Company, of Chicago, and president of the Illinois Furniture Warehousemen's Association, was the chief speaker of the annual banquet.

Ingram Triple Seal Piston Rings

Ingram piston rings, manufactured by the Ingram Motor Company, Newark, New Jersey, show a new thought in design of a two-piece piston ring. They are two-piece rings (two types, regular and de luxe) which are inserted in piston grooves as one-piece rings and are securely sealed at three points and locked by a lip, thus preventing either of the rings oscillating over the other and opening joints. The locking lip is not an extra part, but is cast as

Ingram piston ring.

part of the ring itself. Owing to the locking lip securely sealing the joint of the lower ring, while it permits of equal expansion, it at the same time provides a continuous seal at both joints, which prevents the leakage of compression and by-passing of lubricating oil. When the joint of the lower ring opens any distance, the opening is protected by the entirely closed upper ring at the point of its positive locking device, the lip. When the ends of the upper ring open any distance on the other side, opposite the locking lip, they are sealed by the lower ring. These rings are sealed at three points—over the face and back of the joints. They have equal expansion and contraction their entire circumferences and give a perfectly equalized contact with the cylinder wall.

The lower ring is offset, over which the upper ring snugly fits, and surfaces of rings are provided with oil-retaining grooves. The upper ring has a lip that locks the two rings and prevents one ring from sliding around the other and opening ends. The locking lip also securely locks both rings against any upward or downward motion at the joint. The downward pressure of the expanding gas will distort at the joint an ordinary ring not securely locked and cause either end of the joint to be pressed downward and outward by the power stroke and upward and outward by the compression stroke, thus creating a very free recess for by-passing lubricating oil and leakage of compression back of the joint, besides the ends of the joints will wear ragged and score the cylinder walls. Such a condition is not posisble with the Ingram triple seal rings, because they are securely locked by the solid lip at three points of seal, against any lateral or upward and downward opening or distortion at the joints.

When cylinders wear larger in the course of long usage it is not necessary to regrind cylinders on account of the perfect wearing contact of these rings on cylinder walls, which is due to the extraordinary long life of the rolled radial tension put into the rings. And also due to their perfect expansion and contact all around the cylinder wall they show the least tendency to rub and wear the cylinder wall "out of round." The radial tension is put into the rings by the rolling method. This rolling method is patented and used exclusively by the manufacturers of these rings.

Show Cases by Truck

The value of shipping by motor truck instead of by rail is shown in the following case recently cited by the Detroit Show Case Company:

A consignment of show cases for Ann Arbor was taken on a long Detroit trailer. The shipper saved $75 on that particular shipment on crating alone. The consignee received his goods hours, if not days, sooner than he would if they had been shipped by rail.

That company is now considering delivering all of its show cases within a radius of 150 miles of Detroit by adding to its equipment several more trailers.

To Make 100-mile Hauls

The Motor Transport Company has leased the warehouse at 108 Water street, Tampa, Florida, and is establishing its freight station there. The company announces a policy of shipment of freight by motor truck to any point within 100 miles of Tampa, acting as forwarding agents to points not reached by their motor trucks. The incorporators of the company are: Paul Fish, who will be manager; Jack Mahoney, Otto B. Henderson and M. H. Staples. The capital stock will be $25,000. Four motor trucks are now maintaining regular schedules to West Coast points.

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How to Regulate Parts' Stock

By H. P. DREW

Assistant Manager Service Department, Packard Motor Car Company

THE automobile spare parts business in the country is estimated at $250,000,000 per year. The parts stocks continuously carried on hand by distributers is about $60,000,000. I believe that the effective value of this investment could be doubled by efficient methods. Despite the magnitude and importance of the problem little progress had been made before the war toward truly efficient stock-keeping. Glaring evidences of waste were revealed, principally when some distributer would return several thousand dollars' worth of new parts asking full credit. Obviously the dealer had accumulated a mass of unnecessary stock, but beyond some abortive attempts at obtaining and analyzing dealers' stock inventories, little attempt was made to cope with the situation.

Then came the war. The government suddenly found it necessary to purchase motor vehicles in enormous quantities; and realized that under the vigorous uses of war a large assortment of spare parts was necessary. But what parts and how many of each were required could only be vaguely guessed at because of the lack of definite knowledge of requirements.

Distributers have been and are ordering parts to-day on a basis which, though less obviously at fault in any particular instance, still in the aggregate results in a loss of money and productive effort that is equally far-reaching. Most dealers' stocks contain variations from none of certain active parts to a ten years' supply of others. I purpose to explain the definite steps by which manufacturers can work with their distributers in controlling stock conditions that will result in advantage to the manufacturer, distributer and owner alike.

DISTRIBUTERS and dealers are willing to carry an adequate assortment of parts if it can be done profitably, and this should always be possible, if this business is handled properly. Distributers will accept eagerly any advice that will produce this result. I will offer a method of figuring the logical stock investment that can be followed by any distributer by using his own records only.

The *first* consideration is the number of vehicles in the territory.

The *second* is the total parts business per year, which should be easily obtained from any distributer's books.

The *third*, obtained by dividing the second by the first, is the important factor in the average business per vehicle per year. This will vary in any territory on account of (1) predominance of certain types, (2) the nature of the service; i. e., whether easy or hard, and (3) the number of customers who obtain parts from outside sources.

The *fourth* consideration is the turnover —the total yearly parts business divided by the stock to be carried. If the turnover is three or more (that is, 300 per centum or more), the parts business usually in profitable. The greater the turnover can be made the more profitable the business, but beyond a certain point the efficiency of the shop and satisfaction to customers will be greatly impaired. Generally if the turnover is greater than four hundred (400 per centum), the results are unsatisfactory.

The factors to be considered in determining the turnover are *(1)* the distance from the nearest large supplying stock, *(2)* the size of that stock, *(3)* the severity of the local service, and *(4)* the efficiency of the stock-room and the stock supply system. At the Packard factory we have worked out a method of accurately gauging each of these factors that works beautifully, but is too complicated to explain here.

Finally, having found the annual parts business per vehicle and the desired turnover, we have simply to divide the former by the latter to arrive at the value of the stock to carry.

ASSUME a distributer's territory has 200 vehicles. His annual parts business is $10,000. His business per vehicle is $10,000 ÷ 200 = $50. He has decided upon a turnover of three and one-half (3½). The stock to carry per vehicle is 50 ÷ 3½ = about $14.30. If he expects to market 50 vehicles this year he will have 250 to service at $14.30 per vehicle and will need $3,600 worth of stock. A similar figure can be arrived at independently to check the above, by using the factory figures. Dividing the total value of factory parts shipments to all distributers by the total vehicles serviced gives the average parts business per vehicle per year for the entire country. Multiply this by a factor (either greater or less than one) for any distributer to be considered, depending on the following circumstances: *(1)* whether the local service is heavier or lighter than than the average, *(2)* whether the distributer is or should be obtaining all his parts through the factory. Then the turnover may be estimated for the distributer the same as he has done.

If the factory has to service 80,000 vehicles and the total parts business per year is $3,200,000, the average per vehicle is $40. If a certain territory is more active than the average the factor may be taken as 1.2, which, multiplied by 40, gives $48 expected business per vehicle. Dividing by the turnover of 3½ we have $13.70 stock to be carried per vehicle, or 250 times that, $3,430 for the territory.

Some compromise between the stock to be carried as arrived at by these two methods will be not far from correct. The second method is also available in installing new stocks in local or foreign stations or where local records are not available. Having determined the quantity of stock to carry the physical facilities of the stock-room must have intelligent consideration for efficient and profitable results.

The amount of space necessary is roughly 60 to 70 square feet per $1,000 of stock. In the large stock room this will include the office, receiving and shipping departments. In the small stock room extra space must be provided for these features. The location with respect to other branches of the business is vital and should be given first consideration, even at the sacrifice of other manifest conveniences in the service station. The stock room must be immediately accessible to the repair shop. Mechanics lined up three deep at the stock room window lose valuable time and productive effort obtaining the parts desired. Bringing the stock to the work is one big way that the automobile manufacturer gains efficiency. This principle should be applied to the service station. The stock-room location should also provide for sales direct to customers without interfering with the shop work, and be convenient to the cashier. The sales value of an orderly stock-room is now receiving considerable attention. Some dealers make it a show feature of their establishments.

Having determined the location, the general arrangement must be carefully considered. Besides the stock storing five elements enter—stock receiving, stock packing and shipping, delivery to shop, delivery to customers and stock-room office. The closer these can be conveniently grouped the better, particularly in smaller stations. Except in a considerable size stock-room one person can handle shop and customer deliveries. The two delivery windows should be close together to assure prompt attention and avoid much walking. If necessary a call bell should be used. In the larger stations receiving and shipping should be in a room by themselves to avoid confusion and keep the wood, paper and excelsior from littering the stock-room.

IN carrying the stock itself, it is convenient to classify the containers used into five groups. *First*, for very small parts, such as magneto and distributer parts, small special screws, etc., the smaller drawer type of container about 2x3x12 inches deep, having several cross divisions furnishes a flexible, compact, safe and clean receptacle. One cabinet will provide for several hundred such parts.

Second, the small standard bin is the main reliance of the stock-room. Fully 50 per centum of the total number of parts carried can be contained in a bin 6x6x10 inches. The universal mistake in the past

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has been to provide too few bins of this size. It should be a bin, not a drawer, and should never have less than a 5x5-inch opening to admit a hand freely. The depth should never be greater than 12, 10, or better, 8 inches.

Third, the medium bins, about one cubic foot in size, are on the two lower tiers of the standard small bins, for parts which, by size or quantity, call for more room.

Fourth, the large bin, usually 2 feet deep and high, by 4 feet long, is mostly for carrying box goods such as inner tubes, paint supplies, stationery, etc. Very few of these are required.

The last, or special types, are racks for springs, wheels, fenders, etc., all of which call for special designs.

In laying out the bins, ample aisles, uniform movable bin sections, light and accessibility will all be carefully considered by the trained stockkeeper. Proper numbering is important. Usually attempts to make part numbers and bin numbers correspond fail on account of varying part sizes. But often associated parts may be placed together; such as valve rollers, holders, guides and pins. We have found it most convenient to have the entire bin sections carry letters—each bin row numbered from left to right, and each successive row from the bottom starting a new hundred. Thus bin No. B-317 means bin section "B," third row up from the bottom and seventeenth bin from the left. One stock-room claims a 20 per centum saving in time by this simple expedient.

KEEPING an accurate stock record, and using it intelligently to maintain the proper stock is the root of the stockkeeping problem. Without records the stock-room becomes chaos. The inventory becomes the starting point of the well-regulated stock-room. The usual methods are followed, simply listing on cards the quantity, piece number and bin number of each part, then arranging these cards by the piece number or symbol number as it is sometimes called.

We are now ready to use the perpetual inventory card, which is the simple but comprehensive basis of the entire system, as illustrated. Assuming an accurate inventory of the stock on hand and a record of the activity of each part as shown in the disbursement column, the problem is just how to use this record in maintaining our stock, bearing in mind that over-ordering ties up good money without returns, and under-ordering causes dissatisfied customers, delays and shop losses. We have two conditions to face, *first,* when the demand is considerable and fairly uniform, and *second,* when the demand is erratic, or not great enough to be accurately gauged.

The first condition is readily covered by a system of maximums and minimums. The minimum or danger limit is the point when the stock is only sufficient to last until a new supply can be received. Thus, if two months are required to get stock from the source of supply and a part is being consumed at the rate of six per month, a new supply must be ordered when the amount on hand gets down to twelve.

The maximum is the amount to be ordered, and is also based on the rate of consumption. For small, inexpensive parts listing below 50 cents or $1 we recommend ordering a 12-months' supply, to avoid continuous ordering and handling, in proportion to the value of the stock involved. For medium priced parts from $1 to $5, we recommend a six-months' maximum, and for expensive parts, above $5, a three or four-months' supply. This is a safe method of conserving the investment on large parts, because they are used mostly on accidents or general overhaul work where they can be ordered specially if necessary. Most such parts are usually slow moving.

By the above method it should be possible to supply practically 100 per centum of stock from the distributer's stock-room on demand. This is being done by our large distributers on a large number of parts. Unfortunately, our moderate-sized establishments find that a considerable part of their stock falls in the second class in which the demand is so erratic or so light that the card record can not be relied upon. Until recently the only dependence in such cases was the good judgment of the stockkeeper.

NOW the factory has developed and printed the "Guide for Regulating Parts Stocks." This guide simply gives the distributer the factory experience with regard to a large number of active parts in such a way that it can be applied to his own ordering. For example, a dealer with 100 cars in his territory has used two of a certain part costing $5 during the past 3 months and has exhausted his supply. Previously he used none in a year. Since this experience is inconclusive he refers to the guide and finds that the proper amount to order is two. On a different part the guide might show four, or on another, none. If he follows the guide he is sure to profit, because in the long run his experience is sure to parallel with that of the factory because the factory record represents the grand average experience.

The guide has greatly aided in determining what parts are logical to return to the factory for credit. It has also been invaluable in making up lists of stock to start a new small dealer for any given territory, and especially in preparing assortments to accompany initial shipments to foreign dealers. This guide does not replace the good old judgment method of ordering, it simply supplements and improves it.

No system, however well devised and worked, can be entirely automatic and there are so many phases to this business that the good judgment of an intelligent manager is much needed. In no branch of our business is such great financial responsibility imposed upon such low-grade men. It is not uncommon to see a $100,000 parts business completely in the hands of a $100 man. Such men almost invariably lose to the company many times their salary in injudicious ordering alone.

To operate successfully any fair sized stock-room, the stock manager must have intelligence and personality. He must be scrupulously honest, loyal to the company, coöperate with other departments, be courteous to customers and diligent in meeting their requirements and enough of an executive to command the respect of assistants and to delegate detail work to them.

On the mental side he must first of all have a good knowledge of automobile mechanics and be fully aware of the use and mechanical characteristics of the parts. He must act as a safety valve for the shop men, and prevent them from misguiding him as to the necessity of changing large numbers of certain parts. The Parts Guide is a valuable aid in this direction.

Contrary to the general opinion he need not have an excellent memory—it may even be a handicap in postponing the inevitable but desirable time when stock will be found entirely by the card record. He must appreciate the value of needed records, and use them, but recognize and avoid the pitfalls of red-tape. He must know some accounting. The progressive stockkeeper knows how to use the data on the amount of stock to be carried as outlined in the beginning of this paper. He must have a keen appreciation of the value of money and a real desire to conserve it. He will order parts by the cheapest route whenever possible, and avoid telegrams by anticipating stock requirements.

Few such men are available, and they can not be retained at low wages. We must convince distributers that a good salary for the right man in such a position is a good investment. Then we must train young men who are available for such work. At the Packard plant we are developing a stockkeeper's school which we believe will bring good returns in better stockkeeping, and we have specialists continually advising and assisting dealers in improving their stock efficiency.

Davis' New Position

Francis W. Davis, formerly assistant chief engineer of the motor truck department, has been appointed consulting truck engineer of the Pierce-Arrow Company. Mr. Davis in his new capacity will have an opportunity of maintaining close contact not only with the work in the factory, but also with the agents and owners.

It is becoming more and more recognized that the problems of motor truck transportation are every bit as complicated as railway transportation problems, and it is with this knowledge that Mr. Davis has been chosen to carry on this important work.

Mr. Davis brings a wealth of practical experience in the design, manufacture, sale and operation of Pierce-Arrow motor trucks. This experience, added to his technical training, eminently fits him for his new position. He will be available to agents and owners on transportation problems, involving the design, equipment and operation of Pierce-Arrow motor trucks and auxiliary appliances; with a view to broadening the field of motor truck operation.

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California Dealers Make 1000-mile Motor Truck Run

MACHINES REDUCE SHIPPING TIME

The first California highway motor truck train, which ended its 1,000-mile journey over California highways in San Francisco will go down in history as an epoch-making event as is the account of the first steamship and the first railroad train. Leaving San Francisco, it made the round trip to Los Angeles *via* the Valley Route and returned over the Coast Highway.

The purpose of the tour was to demonstrate to farmers and small town merchants throughout the state the present vital need for motor truck transportation. Thousands of tons of California fruit crops have rotted on the ground this year because of lack of freight cars to haul them, and while the motor truck has helped in many respects to overcome this condition of affairs, it is found that the shipping public really did not comprehend the extent of the motor truck's usefulness. much enthusiasm was displayed at various centers through which the train passed on the down trip. City officials and representatives of the trucking craft extended the train a very hearty welcome at every stop.

At night controls, mass meetings were held in city squares, which included the showing of motion pictures of the recent transcontinental government convoy trip and the manner in which ship-by-truck is working out in eastern sections of the country. Good roads was a very strong theme in many of the talks made, as it was shown where good roads existed prosperity and the per capita wealth are unusually high, ship-by-truck, of course, helping in a large measure toward these ends.

Wherever a stop was made, crowds gathered about the motor trucks plying members of the train with many questions about the different makes of machines and shipping.

The valley trip ended in a monster demonstration in Los Angeles. Mayor Snyder of the southern city met the train on the outskirts and escorted it through the city streets. The train left Los Angeles at 9 o'clock with a ship-by-truck message from the mayor to the mayor of San Francisco in care of F. C. Flickinger, local Firestone branch manager, who was commander of the train. The motor car dealers' association of San Francisco met the train on the outskirts and escorted it to the city hall, where Mayor James J. Rolph received the message from the Los Angeles mayor and addressed a mass meeting from the city hall steps. Wm. L. Hughson, president of the Motor Car Dealers' Association, and Robert Martland, secretary of the Auto Trades Association, were among those who spoke. The return trip was in the nature of a nonstop run to ascertain the actual time taken to transport merchandise straight through from Los Angeles, the only stops being made for fuel and meals. The actual running time was 51 hours, which in comparison to freight shipment by rail is an approximate saving of nine days in time. In addition to the saving in time, there is the saving in the usual heavy cost allowances for breakage in handling rail shipments involving six to eight handlings before reaching the consignee. Shipped by truck, the goods are placed on the machine at the shipper's door and taken off at the consignee's receiving platform, thus taking only two handlings.

The motor truck train was organized by the following Pacific Coast motor truck distributers and the San Francisco Firestone Ship-by-Truck Bureau: Butler Veitch Company, Fageol; Wm. L. Hughson Company, Federal; Garford Motor Truck Company, Garford; International Harvester Company, International; International Mack Company, Mack; Pacific Nash Motor Company, Nash; Earl C. Anthony, Packard; Western Motor Company, Kissel and Maxwell; the White Company, White; and the Peacock Motor Sales Company, Service.

Train Commander Flickinger reports that all of the motor trucks participating showed little effects of the long drive and save for a few minor difficulties no delays were encountered on the entire trip. The demonstration was a huge success.

Selden Exports Heavy

Selden Truck Corporation reports unfilled orders on its books as of November 1, last in excess of $1,600,000. About half of this amount represents foreign orders. The company is making a strong bid for export business and expects to greatly increase its sales in foreign countries. An inquiry has just been received for quotation on 500 motor trucks for Japan where the Selden Company last year delivered more than one-quarter of all the commercial vehicles shipped from the United States.

Boyce As Fire-fighter

Harrison H. Boyce, of the Moto-Meter Company, Inc., Long Island City, New York, has formed a new company, the name of which will be the Boyce-Veeder Corporation, having its factory and office in Long Island City, for the marketing of an automatic and hand operating fire extinguisher especially applicable to motor cars, trucks, tractors, aeroplanes and other automotive vehicles. Offices have already been opened in the Queens Subway Building, Long Island City. It is stated that production will be in full swing January 1st

Asks Pulpit on Wheels

The Rt. Rev. Paul Matthews, Episcopal Bishop of New Jersey, is sponsor for a plan to teach the gospel in out of the way communities from a "rolling pulpit." He has asked the church for $8,400 with which to buy a motor truck fully fitted out as a pulpit, with living quarters for the clergyman assigned to the duty of taking the light of the real Christianity into the farthest recesses of the countryside.

National Highway Traffic Association Convention

SESSION WILL BE HELD IN CHICAGO, JAN. 29

The annual convention of the National Highway Traffic Association will be held at the International Amphitheater, Chicago, Illinois, Thursday, January 29, 1920. The session, which is to be an important one will occupy the entire day and evening. The program, as announced, is as follows:

THURSDAY, JAN. 29, 10 A. M.

Chairman of Session—Arthur H. Blanchard, President, National Highway Traffic Association.

Report of Committee on "Highway Transport Franchises," Chairman, F. W. Fenn, Secretary Motor Truck Committee, National Automobile Chamber of Commerce.

Report of Committee on "Interrelationship of Highway, Railway and Waterway Transport," Chairman, Professor Henry E. Riggs, University of Michigan.

"Effect of Car Tracks on Traffic Capacity of Roadways," by George W. Tillson, Consulting Engineer, La Grange, Ill.

Report of Committee on "Traffic Limitation Strips on Roadway Surfaces," Chairman, C. W. Hubbell, City Engineer, Detroit, Mich.

Report of Committee on "Sign Posting for Detours, and Through Routes in Municipalities," Chairman, Elmer Thompson, Secretary, Automobile Club of America.

THURSDAY, JAN. 29, 2:30 P. M.

Joint session of Highway Transport Conference of the National Automobile Chamber of Commerce and the National Highway Traffic Association.

Subject: "Highways and Motor Transport."

Chairman of session—Arthur H. Blanchard, President, National Highway Traffic Association.

"Taking An Interest in Motor Truck Legislation," by Harry Meixwell, Jr., Secretary, Automotive Industries Legislative Commission, New York.

"Value of Highway Transport Surveys," by F. Van Z. Lane, Transportation Engineer, Packard Motor Car Company.

"Interrelationship Between Highway Transport and Back-to-the-Farm Movement," by R. C. Hargreaves, Manager, Detroit Branch, B. F. Goodrich Rubber Company.

THURSDAY, JAN. 29, 8:30 P. M.

Joint session of Highway Transport Conference of the National Automobile Chamber of Commerce and the National Highway Traffic Association.

Subject: "Highways and Motor Transport."

Chairman of session—R. C. Hargreaves, Vice-President, North Central Division, National Highway Traffic Association.

"Relation of Highways to Motor Truck Operating Cost," by Arthur H. Blanchard, Professor in Charge of Highway Engineering and Highway Transport, University of Michigan.

"Progress in Highway Improvement," by William G. Edens, President, Illinois Highway Improvement Association.

"Constructing Roads for Motor Truck Traffic," by T. R. Agg, Professor of Highway Engineering, Iowa State College.

"Status of Legislation Relative to Snow Removal From Inter and Intrastate Highways," by Raymond Beck, Chief, Goodrich National Touring Bureau.

Townsend Goes to Hooven

R. H. Townsend, for the past six years general construction superintendent for the L. L. Nunn interests, has gone to the Hooven Radiator Company, as chief engineer. Mr. Townsend's thorough technical training and wide industrial experiences make him a valuable acquisition for Hooven. The Hooven Raditor Company is preparing to move to more extensive quarters, necessitated by rapidly increasing demand for its product.

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Costs Wreck Lean 'Bus Lines

By D. C. FENNER

Manager, Public Works Department, International Motor Company

OUT of the problems of increasing traffic congestion in large cities has come a new understanding of the conveniences and economies offered by the motor 'bus. Its acceptance has doomed older forms of transportation just as the surface cars, in their turn, succeeded the horse cars and stage coaches.

In Boston, the Eastern Massachusetts Street Railway Company, operating in the Lawrence district, is charging a 10-cent fare, while 'buses in competition transport passengers on the same route for 5 cents. The street railway company notified public officials that unless measures were adopted to restrict motor 'bus competition, their service would be discontinued. Their statement says that the time has come when the public must choose between street railway and motor 'bus service. Although the 'bus licenses were revoked by the city council, the public's choice is indicated by the increasing monthly loss this competition was causing the traction company, which reached $25,000 in October.

Several crosstown surface car lines in New York City shut down because they could not operate profitably on a 5-cent fare basis. 'Buses under municipal control took their place, gave the public quicker and more satisfactory service for the same fare, and did it profitably. The 'buses of the Fifth Avenue Coach Company have met with phenomenal success, having already traveled a distance of more than 40,000,000 miles. In the words of Mayor Hylan, "The day of the street surface cars has gone forever and it will not be long before New Yorkers will have trackless streets."

IN one year, ending October 31, 1919, the Chicago Motor 'Bus Company carried in its 'buses of fifty-one passenger capacity, 4,106,208 persons on 58,027 round trips. This represents an increase from a daily average of 2,229 passengers in 1917, to 78,965 in 1919. This company has recently introduced a new type of 'bus with inclosed seats on top that will accommodate sixty passengers.

Although the universal use of motor 'buses for passenger transportation is apparently inevitable, their success depends entirely upon certain elements of organization and operating methods. 'Bus operators of the present and of the future may well profit by the experiences of the so-called jitney lines that have failed through loose organization and cut-throat methods of competition. The majority of these lines were operated by ex-chauffeurs and teamsters who, because of the liberal credit extended by motor truck dalers, could do businss with very little capital. Although their equipment was in most cases inferior, they assumed that it could be operated for as little as the high grade and more expensive vehicles that are found in the fleets of successful 'bus line operators. The unsuccessful operator estimated the cost of gasolene, oil, tires and driver's wages and added to this his garage rent and interest on notes. On a basis of what this cost him, plus his profit, he found that he could charge a lower rate than his competitors. Successful operators know that expenses involving the following items must be taken into consideration:

Fixed Charges—

Amortization (reserve for depreciation).
Interest on investment.
Insurance: Fire, transportation and theft; public liability and property damage; collision.
Overhead: Administration requirements.
Taxes.
Licenses.

Maintenance Charges—

Garage: Rent, heat, light, power, etc.
Repairs: Material and labor.
Overhauling.
Painting.
Wrecking crew and equipment.
Mechanics and inspectors.
Battery renewal and charging.

Running Costs—

Gasolene.
Oil.
Tires.
Wages of drivers, dispatchers, superintendents, etc.
Grease, kerosene and waste.

To calculate unit costs on which rates may be based, it is necessary to secure a report from each driver at regular intervals, covering the above items. A simple yet flexible form of monthly report is that used by the Suburban Transit Company of Plainfield, New Jersey, shown herewith. This company operates a fleet of thirteen Mack 'buses in the vicinity of Plainfield, and maintains a thoroughly up-to-date garage with storage and repair facilities.

The low rates charged by uninformed operators imperil the business of those who know their costs. Although the informed operator knows that his competitors are losing money and will sooner or later be forced to give up their business because they have no reserve to repair or replace worn out 'buses, he is helpless to obtain business in the face of their competition, as he knows that he can not lower his own rates. For this reason, franchises should be given only when there is assurance that the operator has made a careful study of the undertaking.

AN interesting analysis of the costs of motor bus operation was made recently in New York City by the Commissioner of Plant and Structures to the Board of Estimate. The proposal was for a permanent municipally-operated system of 'bus lines and shows that 100 'buses operating on a 5-cent fare basis can be made to pay a profit of $376.80 a day. The cost of 100 'buses is figured at $550,000, spare parts at $10,000 and garage equipment at $10,000, a total investment of $570,000. For maintenance, the estimate provides $635,000 yearly, covering liability at $500 per 'bus, garage cost at $250 per 'bus, and 180 chauffeurs at $1,800 a year. Depreciation is figured at 30 per centum a year on 'buses and 10 per centum a year on other equipment. These items, together with provisions for a superintendent, starters and checkers, totals $17.40 per day for each bus.

For running costs, 4 cents a mile is allowed for gasolene and oil, 6½ cents for tires, and 1½ cents for repairs, a total of 12 cents per mile. The plan contemplates the operation of 92 'buses, eight being kept for breakdown service. At an average of 80 miles a day per 'bus, the total 'bus miles per day will be 7,360, which, with the fixed charges, brings the total cost of operation to $2,623.20. At the conservative estimate of 60,000 5-cent fares, or a total revenue of $3,000 a day, the net daily profits are figured at $376.80. The estimate does not include interest on the investment, insurance, other than liability, or state motor vehicle license fees.

MONTHLY REPORT

Driver ..... Route .....
Car ..... Month .....

Day	Miles	Gasolene		Oil		Driver		Maintenance		Revenue	
		Gals.	Amt.	Qts.	Amt.	Driving	Work on Car	Labor	Stores	Chg. Fares	Cash Fares
1											
2											
3											
etc.											

SUMMARY:
Payroll: Insurance:
Stores: Garage:
Depreciation: Misc.:
Tires: TOTAL: UNIT:

Horses Lose to Mail Trucks

Motor trucks are to replace the horse-drawn mail wagons in the business section of Columbia, South Carolina, beginning January 1. Five motor trucks will be used to collect and deliver mail in the business part of the city, where there are now small horse-drawn wagons. The advantage of the plan will be to provide a faster delivery of incoming mail and quicker receipt by the postoffice of outgoing mail. Columbia will be one of the few cities of the South with motorized mail service.

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"Bull" at Horse Feed

(*Continued from page 35.*)

in the country a very small fraction of one per centum are of the particular types desired for war purposes.

He then described an ideal army horse, and how he could be best bred. It seemed obvious from his description of him that the army horse is practically a distinct type, and is in no demand for other purposes. This probably accounts for the fact that the War Department has found it necessary to establish breeding farms to supply the necessary army horses. I failed to see just what encouragement a horse breeder could get from the general's remarks. Certainly I did not feel at all tempted to go into the business of breeding horses for sale to the army, with the knowledge that if any of them did not quite meet the requirements of the army buyers they would be virtually valueless because they were not suitable for any other kind of work.

As soon as the general had left the room the program of eulogizing the horse and belittling the automobile, motor truck and tractor was resumed. There was a good deal of sameness until the last speaker was called.

He was introduced as a bona fide horse trader from the Chicago Stock Yards, and his remarks seemed to appeal to the audience fully as much if not more than anything which had been said previously. The audience showed its appreciation by applauding vigorously several times while he was speaking. The gist of his statements seemed to be that the horse market was in A1 condition. And he was one of those men who didn't just make a lot of general statements and let it go at that. No, sir; he was specific. In fact, he was so specilc that I made some notes of his remarks so that I could verify them, although it was quite evident from his manner and emphasis that there was no need whatever for verifying anything he said. Furthermore, he stated that he was going to give some first-hand facts right from his own business, so of course they would be absolutely O. K. However, here are three facts which he presented which were received with rounds of applause:

First, he had on his books right now an order for 250 horses for a large coal company, which he was having difficulty in filling.

Second, he had just sold a number of horses to a certain Chicago department store (giving its name) which were to be used to replace motor trucks.

Third, he had also just sold a lot of horses to a Chicago evening paper (giving its name) the officials of which had informed him that they had saved several thousand dollars during the past year by substituting horses for motor trucks.

Well, say, you should have heard the noise which followed the enunciation of the above facts (?). The question mark is added because I have since tried to verify the statements by getting in touch with the officials of the department store and evening paper which the speaker had mentioned, and from whom I got a very different version of the two incidents.

First the general manager's office of the department store advised me that the horses they had just been buying were to take care of the holiday trade, which always made greater delivery facilities necessary, especially among the horse-drawn vehicles, since the horses could not be pushed as hard or worked such long hours as the motor trucks. They stated specifically that the horses were not at all for the replacement of motor trucks, nor had they dispensed with any motor trucks, or even considered such a thing. They found the motor trucks much cheaper and more satisfactory than horses for a large part of their work, but still used horses under certain conditions. The extra horses for the holiday season, however, were laid off after the rush was over.

And the newspaper people advised me that they had not displaced any motor trucks with horses, and had no intention of doing so. In fact, they had just received the delivery of a large new motor truck the very day the speaker was giving his facts (?), December 4. Previously they had been using several large motor trucks and quite a number of small ones, all of which were still in service. They were at loss to know who could have made any such statement as the one above mentioned, to the effect that they saved any such amount as $30,000 through the use of horses. I could find no one who had heard of such a thing, or believed it to be a fact. Like the department store people, they still used horses on some routes, but the motor trucks were indispensable for a great deal of work.

I did not deem it worth while to call up the coal company which the speaker had mentioned. No doubt they were in need of additional horses, just as every other coal company which depends on horses to any great extent for its deliveries. It is a practice almost as old as the business itself for a coal company to buy extra horses in the fall and sell them in the spring.

So much for the specific instances which the horse trader mentioned. They were just about as well founded as the much-quoted report which the horse enthusiasts have been ascribing to a large packing concern in Chicago, but which, upon investigation, was found to be entirely unofficial and unreliable, having been made by the stable foreman, and was chock full of discrepancies and misstatements.

But altogether my evening has not been wasted by any means. I've had a good meal, had a great many almost forgotten events and remarks recalled to my memory by hearing the antiquated arguments against the automobile, and while I didn't stay to watch the dance which was scheduled to take place in the adjoining room immediately after the banquet, where the members of the Chicago Equestrian Club would spend the remainder of the evening and perhaps part of the morning, I feel well repaid for the time spent. I might also add that I had seen abundant proof of the truth of the old adage that "none is so blind as he who will not see."

And as I pass out the front door of the hotel I am not so surprised as I would have been a few hours ago, to see several of the "friends" of the horse stepping into automobiles; even some of the most prominent speakers of the evening seem to have debased themselves to the extent of owning one of those "inefficient and uneconomical toys." Which observation causes me to wonder whether there wasn't more "horse" to the banquet than I had thought, after all, for in my reminiscing I recalled an old, half-forgotten meaning to the word "horse" which was in common use on the farm long ago, but which has given way in later years to the term "bull."

Indiana Truck Corporation Holds Convention in Marion Dec. 16

The Indiana Truck Corporation held its second annual convention at Marion, Indiana, on December 16-18, 1919. This convention was for distributers and salesmen of Indiana trucks. A large number of invitations were sent out to the distributers scattered throughout the country in the big cities where commercial and haulage activity is one of the problems. This convention, while primarily for the promotion of sales, was also a meeting with transportation as its problems relate to commercial activity.

The Indiana Truck Corporation had a fine program, one that made the occasion profitable to those who attended, and the company did not overlook features that made it an interesting one; also one of pleasure. There were others besides members of the organization on the program and nearly every section of the country had a representative. One of the features of the convention was a big barbecue—an outdoor celebration—that was staged in true Indiana style.

Louisville Truck Depot

Operators of motor truck routes radiating out of Louisville have organized for the purpose of establishing a central depot to which the shipper may send his goods destined for farms or towns on the routes. Small shipments coming into Louisville also will be distributed from the depot. An expert on transportation matters has been engaged to take charge of the station. The terminal organization, which will have the backing of seven companies operating rural routes is expected to solve the return loads problem in that territory.

To Modernize Hucksters

The Lockwood Manufacturing Company, a $100,000 concern recently organized in Saginaw, Michigan, will mount store bodies on 3-ton motor trucks, providing a complete "grocery on wheels." Orders are said to have been booked for 200 of the outfits from persons and firms who expect to go into the old-fashioned "huckster" business on a modern scale. It will be a "pay-as-you-leave" proposition, the housewife entering at one door, taking from the racks what she wants, and paying for the goods as she goes out.

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Legislation and Legal Decisions

Comments on Current Legislation Affecting Sale and Operation of Machines Together with Answers to Questions Will Be Found in This Department Each Month

By A. KALISKY

COMPETITION and depreciation have necessitated a revision of the early popular estimates of the profitableness of the jitney business; and in the larger cities traffic conditions and the higher operating cost have proved formidable obstacles. But in many cities in many states, particularly in the South, Middle West and West, the jitney continues to flourish, often to the detriment of the street railways, as is shown by the not infrequent reports of declining street railway earnings attributed to jitney competition.

The traffic confusion and the dangers to the public attendant upon the jitney business have naturally resulted in a wave of regulatory enactments. In some instances the state legislatures, doubting, perhaps, whether existing statutes and municipal charters sufficiently empowered such regulation by the municipalities, have by statute expressly authorized the adoption of ordinances for the purpose:

> Tenn. act of April 3, 1915, and Ch. 60, Laws of 1915; Wash. act of April 10, 1915; N. Y. Ch. 667, Laws of 1915; See Huston v. City of Des Moines, 156 N. W. 883 (Iowa); State vs. Howell, 147 Pac. 1159 (Wash.); Public Service Commission v. Booth, 156 N. Y. Supp. 140; City of Memphis v. State, 179 S. W. 631 (Tenn.).

For the most part, however, the municipalities affected have taken such action in reliance upon their general powers.

THE jitney ordinances to a large extent follow a common general scheme. The owner is required to file an application for a special license, giving particulars such as the routes desired to be traversed, the number of cars to be used and their respective capacities. An annual license fee is required, varying in the different jurisdictions from $10 to $150 per car, and graded according to seating capacity. With the application must also be filed a bond or indemnity insurance contract in an amount ranging in the different jurisdictions from $2,000 to $10,000 per car, for the protection of persons who may be injured in person or in property. The ordinances also commonly contain detailed regulations as to manner and conditions of operation.

The widespread adoption of such ordinances has in turn led to a considerable amount of litigation, in which the validity of the regulations and requirements has been contested upon almost every conceivable ground. Since January 1, 1915, such ordinances have been considered by the state courts of Arkansas, Willis v. City of Ft. Smith, 182 S. W. 275; California, ex parte Cardinal, 150 Pac. 348; Georgia, Hazleton v. City of Atlanta, 87 S. E. 1043; Iowa, Huston v. City of Des Moines, 156 N. W. 883; Kansas, Dresser v. City of Wichita, 153 Pac. 1194; Louisiana, Le Blanc v. City of New Orleans, 70 So. 212; Nevada, ex parte Counts, 153 Pac. 93; Oregon, Thielke v. Albee, 153 Pac. 793; Cummins v. Jones, 155 Pac. 171; Texas, ex parte Bogle, 179 S. W. 1193; Auto Transit Co. v. City of Fort Worth, 182 S. W. 685; ex parte Sullivan, 178 S. W. 537; Greene v. City of San Antonio, 178 S. W. 6; Virginia, Parrish v. City of Richmond, 89 S. E. 102; and West Virginia, ex parte Dickey, 85 S. E. 781, and by one of the federal district courts for Tennessee, Nolen v. Riechman, 225 Fed. 812. With one exception (Parrish v. City of Richmond, 89 S. E. 102 (Va.). Ordinance provision requiring applicant for license to be the owner, rather than merely the operator, of the car, held unreasonable, the validity of the ordinance has been upheld. Other incidental questions arising out of the regulation of jitneys have also been considered by the state courts of Georgia, Long v. Railroad Commission, 89 S. E. 328, in New York. Public Service Commission v. Booth, 156 N. Y. Supp. 140, and Washington, State v. Howell, 147 Pac. 1159, and have in each instance been decided against the jitney interests.

Attacks upon these ordinances have for the most part taken the form either of a writ of habeas corpus by an operator under arrest for violation, or of a suit to enjoin enforcement. Apparently the court has in none of the cases found any serious difficulty in sustaining the general power of the municipality to regulate and license jitneys. The objections most seriously considered have to do less with the general power to enact the ordinance than with the particular provisions of the ordinance itself.

IN view of the similarity of the ordinances and the pronounced unanimity of the decisions, it is of little interest to attempt detailed analysis or classification of the various rulings. In a general way, it may be said that the decisions in regard to the regulation of jitneys stand principally for the following three propositions:

(*1*) The state, and by delegation the municipality, has authority under its police power and control of the streets, to adopt enactments regulating the use of jitneys.

(*2*) Licenses obtained under prior vehicle or motor laws do not, as against subsequent exercise of police power by a state or municipality, create either contract rights or property rights within the meaning of constitutional prohibitions in regard to the impairment of the obligation of contracts and the deprivation of liberty and property without due process of law.

(*3*) The separate classification of jitneys, as distinct from street cars, taxi-legislate that this result can be accomplished merely because it involves an advantage to the utility in question as well as to the municipality." Dresser v. City of Wichita, 153 Pac. 1194.

In Long v. Railroad Commission of Georgia, 89 S. E. 328, the jitney interests took the curious course of endeavoring to enjoin the Railroad Commission from putting into effect certain jitney regulations prayed for in petitions filed by the street railway company. The court quite naturally declined to enjoin the commission from considering the question, or in any way to pass upon the subject until regulations had actually been put into effect.

In Memphis Street Railway Company v. Rapid Transit Company, 179 S. W. 635, the street railway company sought to enjoin the operation of jitneys. The legislature of Tennessee had passed an act declaring jitneys to be common carriers, providing that operators must first obtain a license under municipal ordinance, and giving the municipalities full power in the premises, including the power to require a bond of $5,000 per car. At the time of cabs and other public vehicles, is not so arbitrary, unreasonable, or discriminatory as to justify a court in declaring the statute or ordinance unconstitutional or otherwise invalid.

It is perhaps of particular interest to note the attitude taken by the courts in regard to the rights of the street railway companies. In five of the cases one of the grounds of attack was that the ordinance either was designed to create, or would have the natural effect of creating a monopoly in favor of the street railway. In a majority of these cases the court took the ground simply that there was nothing in the ordinance or in the record to sustain the contention, and that therefore the court would not indulge in surmise as to the motives of the enacting body or the probable results from the ordinances. Auto Transit Co. v. City of Ft. Worth, 182 S. W. 685; ex parte Bogel, 179 S. W. 1193; Greene v. City of San Antonio, 178 S. W. 6. In the fourth case the court remarked that if the claim were true that the ordinance was passed in the interest of the street car system, "the question would be largely a political, and not a judicial, one. The remedy would be at the polls, and not in the courts." Huston v. City of Des Moines, 156 N. W. 883. In the fifth case the court went so far as to say:

"THAT the effect of Section 4 is incidentally or necessarily to benefit the street railway company is not the last word to be said. It is of interest quite vital to the municipality that a street car system, not only exist there, but that it be able to subsist and furnish proper and needed service. It is not a misuse of power so to

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the suit, however, the city of Memphis had enacted no ordinance pursuant to this statute. The court held that the jitneys were being operated unlawfully and were in fact a public nuisance; that the franchise of the street railway company, even though non-exclusive, was a property right sufficient to entitle it to restrain competition by persons having no lawful authorization; and that the street railway company's loss of revenue through the jitney competition was a sufficient special damage to entitle it to maintain the action. The jitney interests claimed that the injunction would cause them irreparable damage; to which the court replied that the city might decline to authorize their operation at all. The injunction was suspended for thirty days, in order to give the city opportunity to pass a suitable ordinance if it so desired.

The right to enforce admittedly prohibitive regulations was recognized in Dresser v. City of Wichita, 153 Pac. 1194, where the ordinance regulations were plainly designed to prohibit operation of jitneys in certain central and crowded portions of the streets, where the various street railway lines converged.

The fundamental problem is always the same: how to adjust legally and with economic fairness the overlapping rights and demands of the public, the jitneys and the street railways. Largely as a result of the growth and recognition in recent years of the rules governing the rights and obligations of private capital employed in the service of the public, the courts are having no difficulty in settling the status of this latest addition to the public utility family, promptly and with due regard for existing utilities.

RECENT DECISIONS

Nemzer v. Newkirk Avenue Auto Company, 91 Misc. (N. Y.) 13. The presence on the car of defendant's (owner's) license plates does not create a conclusive presumption of ownership, but one that may be rebutted by other evidence.

ALLOWING CHAUFFEUR TO EXCEED SPEED LIMIT

The Appellate Division of the Supreme Court, Second Department (Brooklyn) has established the very sensible rule that the owner of a motor vehicle is guilty of a violation of the provision of the Code of Ordinances with relation to speed, if the car is driven by a hired chauffeur at an excessive rate of speed, while the owner is in it. People v. Harrison, 183 App. Div. 812.

An automobile is not a "dangerous instrument" and legal rules are applicable to it in the same manner as other vehicles. Martin v. Lilly, 121 N. E. (Ind.) 443.

To the Editor.—October 2, 1918, the manufacturer sold to one of its dealers several standard automobiles.

April 4, 1919, another dealer handling the same line of cars purchased from this dealer several cars at the wholesale price, some purporting to be new cars, and from all appearances and indications were new cars.

June 27, 1919, dealer No. 2, who purchased these cars on April 4, sold a new car, from those purchased, at retail for which he received payment in full.

Q1. Was the car when it was sold on June 27 to the retail customer, who is now driving the car, a new or second-hand car?

Q2. If the car while being stored in the first dealer's place of business received a cracked cylinder during the winter of 1918 and 1919, due to freezing in the garage, and the manufacturer of the car installed an entirely new motor when it was discovered after the purchase by the second dealer from the first dealer that such was the case, would the installing of a new motor and the guarantee by the manufacturer, which becomes operative from the date of the sale to the user, would these acts make the car a second-hand or used car?

Q3. Is it necessary for dealer No. 2 to file with the State Highway Department an affidavit calling this a second-hand car before the original retail purchaser could obtain a license to operate this car?

HARRY OLEWINE,
Anthracite Motor Sales Co.

ANSWERS

The Pennsylvania statutes of June 30, 1919, regulating the sale, etc., of motor vehicles, Section 1, defines the term "used motor vehicle," for the purposes of this act, to mean a motor vehicle which has been sold, bargained, exchanged, given away by, or title transferred from, the person who first took title to it from the manufacturer or importer or the agent of the manufacturer or importer, and is to include all motor vehicles which have been in use in such manner as to have become what are commonly known as "second-hand" motor vehicles or automobiles within such definition.

Section 2—That from and after the passage of this act, it shall be unlawful for any person to sell, convey, transfer or pass title to any used motor vehicle, unless he shall, at or before such sale, conveyance, transfer, or passage of title, deliver to the vendee, buyer or transferee thereof, a full description of such used motor vehicle in duplicate.

The meaning and intent of these statutes are clear; a car is a "used" or "second-hand" car only after the original retail purchaser has conveyed title in accordance with the statute and then only after the car had been used or driven by the seller. The word "used" car in the statute has the same meaning as "second-hand" car. No other use than that of the actual consumer or purchaser will require registration as a used or second-hand car and then only after title has been conveyed and is in the hands of the purchaser.

With these explanations, the answers to the questions submitted are as follows:

A1. The car when sold on June 27 to the retail customer was a new car and not a second-hand car.

A2. The acts of the manufacturer in installing a new motor would not make the car a second-hand or used car; the car would still be a new car.

A3. It would therefore be unnecessary for dealer No. 2 to file with the State Highway Department an affidavit calling it a second-hand car.

To the Editor.—January 8, 1919, we received from an automobile manufacturer a standard automobile.

February 25, 1919, one of our agents received a bona fide order for this car with a deposit of $100 and same was invoiced to our customer, being a retail sale.

June 7, 1919, the customer who made the deposit of $100 having failed to take delivery, we sold this car to one of our associate dealers, who in turn sold it to a retail customer of his.

Q1. When would this car become a used or second-hand car?

Q2. If the retail customer who purchased this car on February 25 received a license from the State Highway Department, but never accepted delivery of the car and never used his license tags, would it be necessary for another retail customer, who purchased the same car from our associate dealer on June 7, to fill out Form No. N-159 with the State Highway Department calling this a second-hand car before he could obtain a license to operate the car?

Q3. If a retail customer contracted for a certain car, made a deposit on same, applied for his license to operate the car, but never accepted delivery, drove, or rode in the car, would these acts, constituting a valid sale, make a second-hand or used car out of this particular car if the car had never been used or driven?

Q4. Would a car be considered a new car if it passed from the manufacturer to the distributer, from the distributer to the dealer, from the dealer to the subdealer and so on, always being sold at the wholesale price, until it might finally be sold to the retail customer who becomes the user and driver?

HARRY OLEWINE,
Anthracite Motor Sales Company.

ANSWERS

A1. This car under the Pennsylvania law would become a used or second-hand car in case the retail customer after making it a used or second-hand car by driving conveyed title and then it would be a used or second-hand car and subject to registration as such only in the hands of the purchaser, from such retail customer.

A2. It would not therefore be necessary for the retail customer to fill out form No. N-159 with the State Highway Department calling it a second-hand car.

A3. The acts of the retail customer as indicated in this question would not make the car "used" or "second-hand."

A4. The car would still be considered a new car even though it passed through the hands of the various parties indicated in this question.

Running for a Convention

There has been developed a great race for the next convention of the L. M. A. T. A. Lake Charles, Louisiana, is going to see a lively finish. Gulfport and Biloxi on one hand and Hattiesburg on the other are already working. Meridian and Vicksburg are contenders in the race.

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Pneumatics Win Against Solids in Six-Month Test

RESULTS SHOW $1,500 SAVING IN YEAR

AKRON, OHIO, Dec. 23.—The question of whether the solid tire or pneumatic tire for heavy trucking duty delivers the most miles per dollar, where speed and economy must be factors in deliveries to customers, has just been determined in favor of the pneumatic tire, after a six months' test by one of the largest oil companies in the world.

Two standard motor trucks, each of 2-tons capacity, one equipped with Goodyear cord pneumatics and the other with solids on the rear wheels and pneumatics on the front wheels, were used to make the test. Had solids been used on all wheels of the second machine the pneumatic-tired equipment would have made a much better showing.

Drivers of both motor trucks worked the same number of hours and in the six months' period the motor truck on pneumatics covered 6,414 miles and made 8,730 deliveries at a cost of 45 cents a truck mile, while the vehicle on solids traveled 4,476 miles, making 6,276 deliveries, at 56.3 cents per mile. The cost per truck mile as figured above embraces everything chargeable to motor truck operation under the national standard cost system which governed the test. The motor truck on solids covered 34.6 miles a day, serving 51 customers, while the one on pneumatics covered 49.5 miles a day, serving 64 customers. A saving of 76 per centum in the use of oil was shown by the machine riding on air. Its record was 104 miles per gallon, compared to 59 miles per gallon by the other motor truck. In gasolene consumption the power wagon on pneumatics delivered 5.77 miles per gallon, compared to 3.98 miles delivered by solid-tire equipment—a saving of 45 per centum.

Motor truck tire users will be interested in two big outstanding features of this test. One is that the oil company has specified pneumatic tires on 42 new machines. The company is well convinced that it is cheaper to operate a motor truck on pneumatics in making quick deliveries on long-distance freighting hauls. But the feature most emphasized is that very rarely do fleet owners permit a comparison test of six months' duration. It is usually found that at the end of the first month the saving on pneumatics is so apparent that change-overs are ordered and the test discontinued.

Movers Profit by Trucks

Motor trucks are yielding such surprising profits in the business of moving household furniture that the day is not far distant when a horse-drawn furniture van will be a rarity. In the earlier days of the motor truck, many movers believed that motor trucks could not be used profitably in their business because of long loading and unloading periods. Those who pioneered in the use of motor trucks, however, found that they were far more profitable than horses.

A further analysis of the work of these motor trucks shows that the machine on pneumatics did in six months what the one on solids can not accomplish short of eight months and 15 days. It costs approximately $724.18 more to operate the motor truck on solids for the test period than it did the one riding on air. This is equivalent to a saving of nearly $1,500 a year by using pneumatic tires in the exacting work demanded of oil motor trucks.

New Trade Literature

"Forty-eight of the first fifty Pierce-Arrow motor trucks are in operation today after eight years' usage." This fact is the basic message of a new booklet published by the Pierce-Arrow Motor Car Company.

The booklet, which is entitled, "The First Fifty," gives the history of each of the veteran motor trucks, which were built in 1911. Only one was retired, and this served through seven years of drastic use. The other not now running was destroyed in a fire three years ago.

The First Fifty is a valuable addition to motor truck literature, for it traces the experience of users in many different lines of business in which motor trucks have served reliably for 150,000, 250,000, and even 300,000 miles.

The Union Switch & Signal Company, Swissvale, Pennsylvania, has recently issued a new bulletin on drop forgings containing illustrated descriptions of many new parts added to the company's range of product, more particularly in heavy forgings for motor trucks, such as axles, spindles, knuckles, brake bands, etc. It has installed six additional steam hammers up to 6,000 pounds in the last six months and now has a capacity of 1,500 tons of forgings per month. It has also equipped for completely machining crankshafts ready for assembly.

Lee Loader Data Sheets

The Lee Loader & Body Company, of Chicago, has recently published a number of loose-leaf data sheets that are of unusual value to users of motor trucks, trailers and special body equipment. The first edition of the data sheets is ten in number and contains handy specifications, tables showing the weights and volume of various materials most commonly hauled, draw bar pull, tractive resistance of various road surfaces, tractive resistance on grades in pounds per ton, and many other very valuable and much used information. Additional sheets will be issued from time to time, the whole forming a collection of data that will be most welcome to motor truck users.

New Des Moines Office

H. W. Johns-Manville Company announces the removal of its Des Moines office to more modern quarters at 213 Ninth street on January 2. W. B. Roberts, Des Moines manager, says that the new location will give him better facilities than ever for serving Iowa with asbestos and magnesia, electrical, automotive equipment, and allied Johns-Manville products.

One Truck Replaces 8 Horses in Coal Hauls

WORK HOURS SHORTER; MILEAGE INCREASE

A concrete example of the benefits to be derived by the use of motorized delivery is to be found in the success of the Weber-McLaughlin Company, of New York City, one of the largest coal dealers in the greater city.

Starting in a very small way some 16 years ago with three horse-drawn wagons, the horses for which it hired for the delivery of a few hundred tons of coal, this enterprising institution now operates a fleet of twenty-two motor trucks and its volume of business runs into the hundreds of thousands of tons a year.

Louis S. Weber, president of the company, in discussing the subject recently stated that the real growth of his company started in 1912, when it changed from horse-drawn delivery to motor trucks. In a recent interview on truck operation as it has benefited his company, Mr. Weber said:

"We figure that one motor truck takes the place of eight horses in our business and that the increased radius over which we can operate in much less time has been one of the big factors in our growth. Then, too, the dependability of the motor truck in all kinds of weather as against the horse enables us to get the loads to our customers when they need them most—in the bad weather.

"I well remember the time when, after a slight snowfall, we have used as many as thirteen horses to haul three or four tons of coal on a slight grade.

"Formerly a customer who ordered five tons of coal received five deliveries of one ton each. To-day seven or eight tons are hauled in a single trip, with the motor truck delivering as many as 100 tons a day, and the delivery hours are shorter than in the days of horse-drawn trucks. Many buildings in the city consume from twenty to fifty tons, and in some cases 100 tons of coal, in one day. It would be almost a physical impossibility to deliver 100 tons of coal a day with horse-drawn equipment to some of the buildings because of the poor unloading facilities and the slowness of team delivery.

"All horse-drawn vehicles have to be dumped by operating hand cranks, while with motor trucks the tendency is to dump by means of a hoist attached to the motor. The result is that the driver can work as efficiently at the end of the dav as he can at the beginning, for the work is done mechanically and is not slowed down because the driver is tired."

The Weber-McLoughlin Company has always maintained its own garage, its present steel and concrete garage and machine shop at 641 to 645 West 130th Street, conveniently located to the coal pockets at 132d Street and the North River, being one of the most up to date and well equipped privately maintained garages in New York.

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Education Cuts Repair Bills

By A. B. CUMMER
Service Manager, Autocar Company

A SERIOUS service problem of the motor truck distributer is properly to impress upon the user a sense of responsibility for the care and operation of this vehicle. This education should continue until the owner fully realizes that he assumes an obligation to maintain the car continuously in an efficient condition, both for the sake of his pocketbook and for the transportation he expects from the investment.

The campaign must be educational and not mandatory, showing the customer that any trouble he may go to in properly handling his car is entirely for his own benefit. Telling once by spoken or printed word is not sufficient. Continuous help by pointing out better methods and correcting faults is the duty of the service department. The car is entirely in the user's control, completely beyond the jurisdiction of the distributer. This must be remembered in any plan for the owner's education.

Repeat orders represent about 50 per centum of our business. But they are based on satisfaction which results only when motor truck transportation has proved economical in a big sense. Economy, then, must be fostered, and this can be done only through spreading the gospel of intelligent care and handling. The manufacturer delivers an efficient machine, capable of successful operation for a number of years. But when the motor truck is installed, responsibility passes to the user. In selling a car we sell with it a maintenance expense account, the extent of which depends almost entirely upon the user. The better he is educated in proper operation and maintenance methods, the less the expense account will be.

FIVE commonly neglected features of motor truck operation are responsible for most current repair expenses—lack of regular inspection, lack of intelligent lubrication, loose nuts and bolts, overloading and overspeeding. The average current repair bill can be reduced at least 50 per centum if the owner gives reasonable attention to these five commonly neglected points. There are many channels through which educational work can function, but this work may be divided into two classes, the printed or advertising part, and the oral or personal part. That which is printed and which applies to a certain vehicle should emanate from and be distributed by the maker or distributer. Simplicity should be the keynote of all maintenance instruction matter for drivers. Use of definite colors in lubrication charts greatly simplifies them and makes them easier to follow. It might be within the province of the N. A. C. C., through the proper committee, to suggest a standard set of colors for lubrication charts, where one color would indicate "daily attention," another "weekly," a third "monthly," and so on.

In the educational program any publicity that would emphasize the owner's responsibility is advantageous, and here again is a field for work by the N. A. C. C. It could widely spread fundamental maintenance truths that would apply equally to all motor trucks. For any manufacturer to lay undue emphasis on the care of his motor truck in publicity might result in raising doubts as to the quality of his product. Activity from the N. A. C. C. would not reflect on any particular product and a broad policy could be pursued which would surely result in much good to the industry as a whole.

THE most valuable feature of the educational work is the personal and individual contact with each owner. This continues throughout the time the vehicle is in service. It should start with the first visit of the salesman. He should sell to the customer a sense of responsibility of the obligation that is assumed. Salesmen should realize that they have a mission in the education of a customer from a service standpoint. Sales make service, and service makes sales. It is to the interest of the salesman that his customer obtains the maximum of service from the vehicle.

The salesman's personal acquaintance with owners makes him the logical man to start the educational campaign, and his words will have more weight than a great deal of printed matter. Primarily he should place responsibility upon the owner, and then, if his instructions cannot be definite or technical, put the owner in contact with the service department, where his education can be carried further. When car is delivered to a new owner he should be advised that he can make repair bills large, or almost eliminate them. An excellent method of impressing his responsibility for his bills is to write on them the particular cause, be it carelessness or neglect, of the trouble that made the repairs necessary.

Offering free service is to be carefully guarded against, it is so often misinterpreted for free repairs. Free repairs should be confined to those which he is entitled to under a liberal interpretation of the policy that he shall receive a square deal from the seller.

The owner should be told precisely what the company's service policy is, and nothing should be left to his imagination. If the salesman sells the service policy with the vehicle, little misunderstanding can arise between the purchaser and the company. It is human nature to find fault with the man who sells the goods when they are not rendering satisfactory service. Therefore, logically the customer's complaints are made to the salesman. If the salesman has received his maintenance education he should be able usually to point out the remedy to the customer without recourse to the service department. Generally the service department has had too little to do with the customer until after delivery. Between the close of the sale and delivery of the car, service department might do excellent primary work with the customer, and assist in making proper preparation for the operation of the car.

Part of the customer's education can be given through what we have found very valuable, drivers' or owners' maintenance talks, given at regular intervals at branch service stations, where the vehicle is taken up section by section, and proper care and attention carefully explained; also going further into the damage and expense that will result if neglected. Experts on such things as carbureters and magnetos can be introduced; these specialists volunteering from the makers of these articles.

Monthly inspections should be given, not only to determine the condition of a car, but to inform the owner how his equipment is being maintained. Reports of inspections should be mailed owners, and attention called to it if the same trouble is noted on successive reports. Further, the monthly inspection brings the question of the motor truck's welfare to the attention of the owner at regular intervals. Owners should be urged to give as much attention to the condition of their equipment as they do to maintaining their plant, stocks, etc., in A-1 shape.

THE responsibility of an owner for proper operation of motor trucks goes beyond simply keeping them in good repair. It may be necessary for him to speed up other elements of business to meet the more rapid conditions obtained by using motor trucks. This problem is for the salesmen to handle, and should be satisfactorily worked out to make the use of motor trucks economical.

I like to visualize the division of responsibility of the parties concerned as a three-legged milking stool, legs labeled this way:

Maker's responsibility—"Make 'em right."
Dealer's responsibility—"Keep 'em right."
Owner's responsibility—"Treat 'em right."
all three legs holding up the seat labeled "square deal and satisfaction." Any leg that fails to function causes the whole structure to topple over.

A movement has been started to make Los Angeles, California, the terminus of the Lincoln Highway. The proposal is to establish a branch of the great transcontinental highway from Ely, Nevada, to the California city, a distance of 770 miles.

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At the coming National New York and Chicago Truck Shows, the Smith Wheel exhibit will be found on the various makes of Trucks shown.

Compare such exhibits with others, in total number, representativeness of makers and capacity of Trucks.

You will thus gain some idea of how rapidly Smith Wheels are increasing in popularity with the Trade.

The story, told in this way, no one can question.

[Syracuse, N. Y., December 15, 1919]

Please mention "Power Wagon" when writing to advertisers.

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Board for Horse in Few Months More Than Equals Animal's Value

The Rock Island, Illinois, arsenal, has been designated by the War Department as the center of manufacture, storage and distribution of tanks and tractors. According to Col. L. B. Moody, an officer in charge of the tank, tractor and trailer division of the Ordnance Department, tanks and tractors are not only effective machines of warfare, but they are the most economical reserve force of an army in peace.

"Efficiency of these machines was proved in war," declared Col. Moody while at the arsenal upon an inspection tour, "and, in peace, they will replace horses that eat their heads off in two or three months. Valuable horses, trained in artillery service, are being sold because of the great cost of keeping them and the greater economy in maintaining the power equipment. The cost of feeding a horse is a dollar per day, while the care is additional. In a few months the horse has eaten more than he is worth. The original investment stands in the case of a tractor, but, after that, the cost is practically nothing if the machine is not in use. The standard tractors selected by the War Department are the 5- and 10-ton capacity. The tanks we use are the 6-ton and 8-ton. Motor transport equipment, or that which follows the highways, is placed in one class and tractors and tanks, known as cross-country equipment, in another."

In Mud, Spurns Railway

Some time ago, when the railroads were so short of cars that traffic was congested, the Clydesdale Motor Truck Company, Clyde, Ohio, was so badly in need of axles for its motor trucks that one of its 5-ton machines was sent to the Timken-Detroit Axle Company, Detroit, for the parts. The trip was so successful that all axles have been so hauled ever since, and the company finds that it is cheaper and more convenient than shipping by railroad. Every month sees an increase in the amount of freight that is shipped by motor transport and the time is coming when the great majority of short hauls will be carried by motor trucks.

Covert Promotes Merchant

R C. Merchant, who has been connected with the sales and engineering office of the Covert Gear Company, Inc., has been made sales manager of the company. Though the factory and main office of the Covert Gear Company, Inc., are in Lockport, New York, the sales and engineering departments are located in Detroit, where Mr. Merchant will continue his duties in his new capacity. Frank E. Endigan, who has been connected with the company for eight years in various positions, has been appointed purchasing agent.

Polack Moves Offices

The general offices of the Polack Tire & Rubber Company, which have been located in New York City, have been removed to the factory at Bridgeport, Connecticut. The company will continue to maintain an efficient sales organization in New York.

Coal Famine Offers Truck Field for Service

Close Co-operation Among Owners Best Solution to Emergency Threatening Life of the Nation

COAL is the nucleus around which the nation's transportation system is built. Upon its availability depends practically every means of transporting goods from the producer to the consumer with one exception—the motor truck. When one mode of accomplishing a purpose is so affected that it can not operate, it is but natural for its users to seek another, and it is for this reason that the impending coal shortage has a vast significance to the motor truck industry.

Reports issued by the Geological Survey, Department of the Interior, show that the production of bituminous coal, the kind most generally used by railroads, for the year 1919 up to November 1, reached only 80 per cent of the production for the same period in 1918. While 504,339,000 tons were produced in the first ten months of 1918, only 404,040,000 tons were produced in the first ten months of 1919. Production of anthracite coal for the same period fell from 60,589,000 tons in 1918 to 53,926,000 tons in 1919.

The period up to November 1, 1919, takes in production up to the beginning of the coal strike and represents the supply obtainable under normal conditions. The strike of the coal miners, however, and the heavy winter demand for coal can not help but deplete the supply on hand to such an extent that railroads will be forced to curtail shipments on account of their inability to obtain fuel to operate their lines. This is the very least that can be expected. P. H. Aishton, regional director of the northwestern roads, has said that a nation-wide embargo on freight is the only way in which the emergency can be met. An embargo on all freight on the Chicago, Milwaukee & St. Paul Railroad between Chicago and the Pacific Coast is already in effect, and it is said that only ten to twelve days' supply of fuel is available for railroads of the central western region.

So much for the seriousness of the situation that confronts shippers and receivers of goods—in fact, every one who has an interest in transportation, including the consumer. What does it mean to the motor truck industry?

As a forceful pinch of necessity it will mean the opening of new fields for an even wider exploitation of the motor truck—of its adaptability and economies—than was offered by the freight congestion of 1917, during which the 435,000 motor trucks in use hauled 1,200,000,000 tons of materials. It should sound a warning to prospective purchasers to get their orders in while immediate deliveries are obtainable. It should be an added incentive to dealers to intensify selling efforts, and to manufacturers to enlarge production to meet demand.

Motor trucks will be called on, as they have been in previous emergencies, to handle the traffic that the railways can not accommodate. They will bring foodstuffs direct from the producer, coal direct from the mines, and manufactured products direct from the manufacturer—to the door of the retailer or consumer. The measure of reputation for economy and satisfaction they reach, however, will be directly in proportion to the amount of organization and efficiency of operation that is applied to their use. Unorganized and with each motor truck operating where it will bring the most profit to its owner at whatever rates the "traffic will bear," they will make the very least of the opportunity that is offered them. Working along definite routes at uniform rates and in coöperation with one another to assure full capacity loads both going and coming, they will establish a record for proficiency and hasten the time when they will replace the railroad in many forms of hauling. This implies the encouragement of motor express routes, organized by public service laws if necessary.

It is very readily conceivable that the effects of the coal shortage will be so far-reaching that the production of high-grade motor trucks in sufficient quantities to meet demand, will be impossible. In such an event it behooves the motor truck owner to obtain the greatest amount of productivity he can from each unit in his service. Maintenance cost records, return load bureaus, selection of drivers, driver coöperation, and time-saving loading and unloading methods are some of the things that the operator can not know too much about. It is the duty of the manufacturer and of the salesman to furnish the owner with educational data and ideas that will be helpful to him, and it is the duty of the owner to apply careful study to the fulfillment of his transportation requirements.

That the compulsory use of motor trucks by those who have always depended on the railroads will cause a great many to ship their goods by motor vehicles in the future is a foregone conclusion. While the efficacy of the motor truck has already been proven, many have still to be educated to its economies, and a situation such as the coal shortage will bring on provides the best means for that education

Sinram Promoted

F. W. Sinram, president of the American Gear Manufacturers' Association, has been elected president of the Van Dorn & Dutton Company, of Cleveland, Ohio. Franklin Schneider was elected vice-president at the same time. Mr. Schneider is not only well known among the gear manufacturers and users of the country, but also is president of the Van Dorn Electric Tool Company.

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Service

MOTOR TRUCKS
Builders of Business

Consider the Advantage

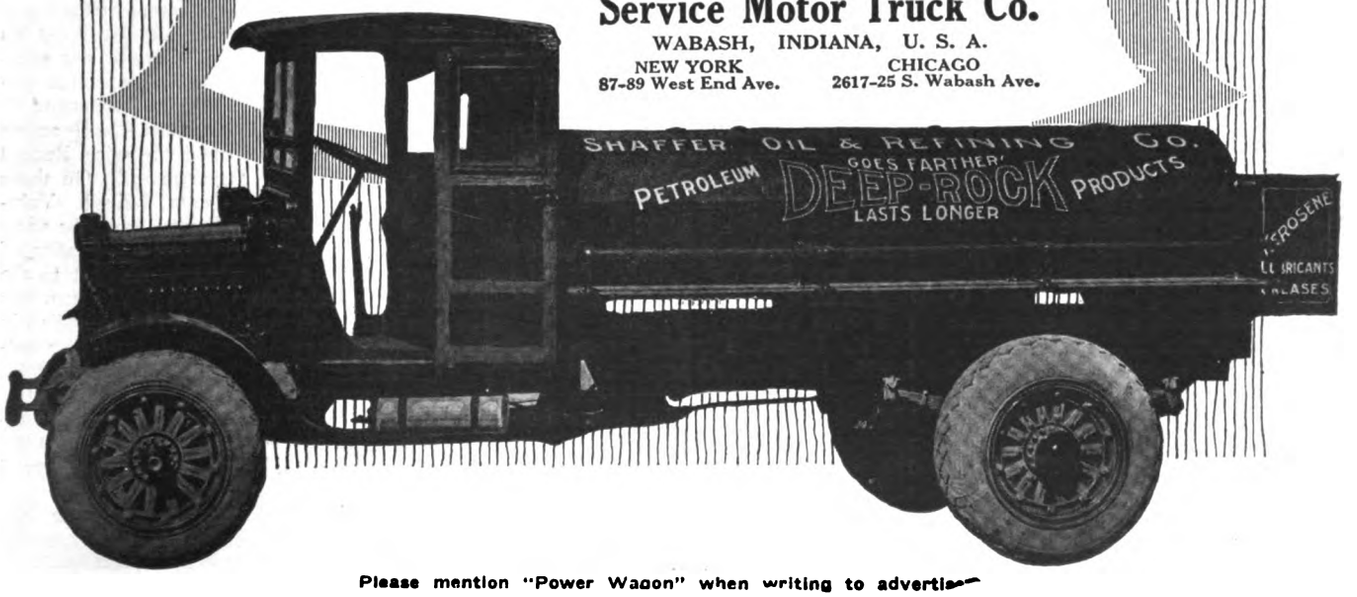
In selling SERVICE Motor Trucks the dealer is at an advantage. He approaches his trade with a confidence born of proven performance. He knows that the manufacturers of SERVICE have developed a line of trucks capable of handling all haulage needs—and handling them *well.* He feels secure in the knowledge that an organization of SERVICE size and strength, based on sound financial and business methods, is back of him.

Below is part of a letter written by William DeVall, SERVICE Distributor, located in South Bend, Indiana, to a prospective dealer:

> *"The first truck I sold is still running. As near as we can figure it has gone 175,000 miles. Every SERVICE I sold has stayed sold. Not one has been traded off for ANY OTHER truck. Here in South Bend they hold the reputation of being best on the street, and we have all makes here.*
>
> *"As for the Service people themselves, I can't say too much. They always stand ready to make good. They want to see the dealer get along, they help him wherever they can. I feel that I am one of the company, having been connected with them for so long."*

To reputable business houses in all parts of the world, we can offer a profitable connection. Write if you are interested. Seven models from 1 to 5 tons.

Service Motor Truck Co.
WABASH, INDIANA, U. S. A.
NEW YORK 87-89 West End Ave.
CHICAGO 2617-25 S. Wabash Ave.



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Service Records Improve Design

By WALTER M. LADD
Service Manager, Pierce Arrow Motor Car Company

TO MAKE my subject clear and amplify it, I wish to approach it from the standpoint of "the influence of service experience on the design and manufacture of motor vehicles." It has been my experience that the service problem from the standpoint of the responsibility of a factory service department resolves itself into three fundamental elements:

1. The betterment of the product.

2. The betterment of the service organizations in the field, *i. e.*, the building up of a national system of dealers or branch service organizations, to give direct service to the customer.

3. The organization of the central factory department to accomplish these aims.

A service organization embracing the factory and dealers' service departments has opportunity to render incalcuable service to the manufacturing and engineering departments to make a superlative product. If given this opportunity, the betterment of the product through service records is one of the biggest, if not their chief responsibility.

What has brought the automobile industry to its present high state of development? First, design alone was considered; then design based on economic and quantity manufacture. The next step in evolution of design is bound to be design based on manufacture and scientific accumulation and study of service records.

MANY of the original designs in the light of present progress, look like monstrosities. Engineers were concerned then only with getting machines that would run with fair success. Efficient manufacturing, or economy in performance and repairs entered but little as there was practically no past experience upon which to draw and not enough cars in use to gain other than a most rudimentary service experience.

The next long step came when the demand for big production caused manufacturing departments to strongly influence and modify design. This resulted not only in economy in manufacture and increased production, but unquestionably simplified and improved design. In this period tool design played an extremely important part.

We are rapidly approaching the third big stage where engineers will be forced to take into consideration service experience in addition to manufacturing requirements. The progress of highway motor transportation and the consequent tremendous growth of the motor truck industry will rapidly force us to make a more thorough and scientific study of motor trucks under actual service conditions. Motor truck users, particularly those operating large fleets, are making a close study of their costs, including their tonnage, operating, and maintenance costs. There is increasing demand for machines more capable in performance and more economical in operation and maintenance. Even passenger cars have certain weaknesses that would be eliminated if the engineers had proper service data to guide their design.

Many engineers and designers are carefully investigating all service data they can obtain in addition to the records they keep on experimental cars. But in the average engineering department their field of information is limited, the sources from which they could obtain data have not been developed. It is not yet clearly appreciated that the thousands of machines in daily operation, meeting every conceivable condition, represent a wonderful field for constructive design and improvement in quality of manufacture.

THROUGH a properly organized plan of obtaining engineering data on cars and motor trucks in daily use, it is possible to better the product in respect to:

(*a*) Performance
(*b*) Weaknesses in Design
(*c*) Defects in Workmanship
(*d*) Defects in Material
(*e*) Inaccessibility for Economic Repairs

Performance covers the ability to satisfactorily meet an owner's requirements as regards power, smoothness, gas and oil economy, riding qualities, or in trucks, power on grades, speed per ton mile, etc. *Weaknesses in design* cover the failure of parts due to improper proportions, poor functioning, rapid wear due to wrongly designed lubrication, crystallization or fatigue due to unnecessary vibration, etc. *Defects in workmanship* include poor machining and improper assembling and fitting. *Defects in material* cover defective castings and forgings, wrong specifications, improper heat treatment, etc. *Inaccessibility for economic repairs* is a question of design but not a weakness in the previous sense. It covers both the time and cost element of repairs and is vital particularly in motor truck design.

Our company has developed a plan to improve the design and quality of its product through service engineering records. All letters and information of a mechanical character bearing on actual performance of product and troubles experienced, are handled through one central department, instead of having certain information go to the engineering department, some to the sales, parts, manufacturing and service departments. In most companies handling complaints is the chief function of the service department, so that this coördination of information should not be difficult.

For eighteen months from the start of production on a new model car or motor truck, our service department follows them in closest detail, making a complete record through the various channels of information later mentioned. Nothing of a serious nature caught by and data will be obtained on cars that have covered upward of 25,000 miles. After the eighteen months, we follow for an additional two or three years, the rapid wear or failure of vital parts.

We have developed the following channels of information for engineering data:

(*a*) Reports on special forms from traveling service men.
(*b*) Reports on special forms from agents' service manager and mechanical men.
(c) Letters from traveling service men.
(*d*) Letters from owners.
(*e*) Letters from agents.
(*f*) Parts returned for credit.
(*g*) Parts for current models ordered.
(*h*) Vital parts ordered for old models.
(*i*) Data obtained from analysis of jobs in the factory repair shop.

FOR noting the above information, various card forms are used. To obtain coöperation from dealers, they are informed that the information is needed for engineering purposes which will directly help them through the improvement of the product. As a further great aid, we insist on having complete information for our engineering files before considering claims adjustments. Agents' service superintendents and foremen are furnished with report cards which are termed "Service Record for Experimental Department." On these are headings for the data desired. Valuable information is obtained from the parts returned for credit. When the quality of material is in doubt, parts are sent to the metallurgical laboratory, which in turn fills out forms returned to us to be embodied in the final report. Another form is for noting the condition of cylinders and pistons, either reported by an agent or returned to the factory for excessive wear or poor fitting. Still another card is used for obtaining the report of conditions of commercial parts or accessories.

To obtain information regarding the

(*Continued on page* 100.)

20th Convention Big Success

Large attendance and many talks of an instructive nature marked the twentieth annual convention of the Illinois Implement and Vehicle Dealers' Association, held in Peoria December 2, 3 and 4. Officers were elected as follows: President, O. T. Myers, Illiopolis; vice-president, S. N. Dillavon, Champaign; secretary-treasurer, W. L. Derry, Vermont. An exhibit of tractors and other power farming machinery was given at the Coliseum by 100 manufacturers. About 800 delegates, representing the leading implement and tractor dealers of the state, were in attendance.

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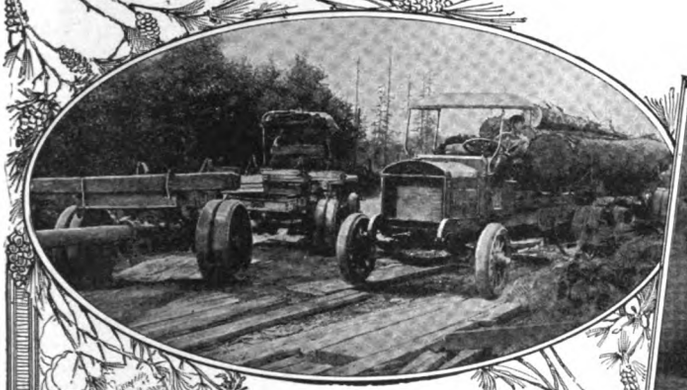
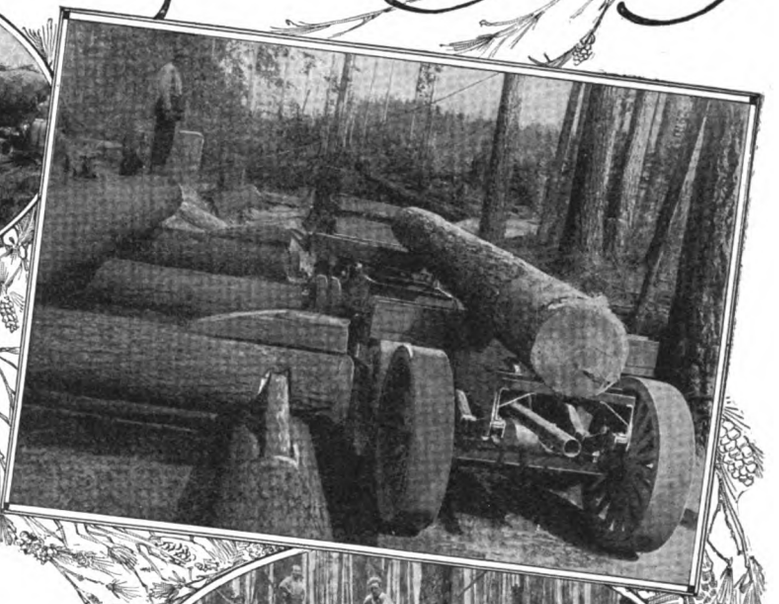
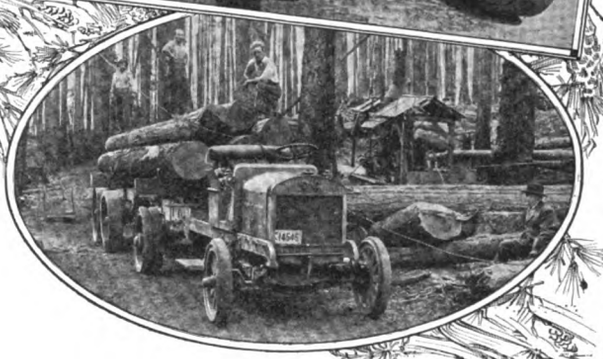
EISEMANN MAGNETO

for Heavy Duty





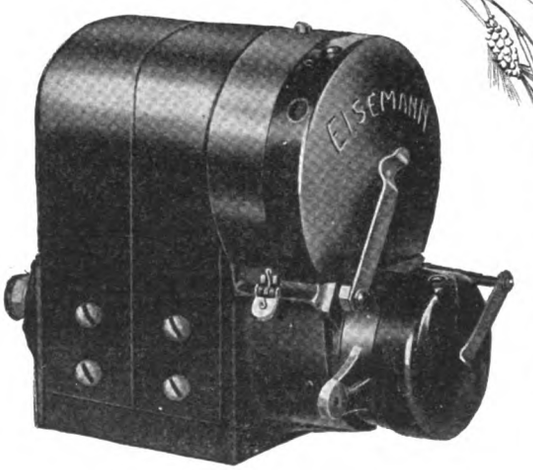


IN the great forests of the Northwest logging operations are a most severe test to trucks and equipment.

The engineers of the General Motors Company are just as careful in the selection of the Ignition as of every other part that enters into the finished product.

GMC trucks have been Eisemann equipped for six years.

The Eisemann Magneto is sturdy, rugged and powerful—the very perfection of the science of ignition.



THE EISEMANN MAGNETO CORPORATION

Plant and General Offices—32 Thirty-third St., Brooklyn, N. Y

CHICAGO—910 S. Michigan Avenue
DETROIT—85 Willis Avenue, West
LONDON, ENG. Stanley J. Watson, 37 Sheen Road, Richmond

See Us at the Shows: Chicago Passenger Car Exhibit, Spaces 8-9-10-11. Chicago Truck Exhibit, Spaces 32-33

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Records Improve Design

(Continued from page 98.)

parts on current models ordered or orders for what we term "vital parts for old models," a special card is sent to the agent ordering the parts, to note the cause for replacement and the nature of the trouble in as much detail as possible. As agents do not stock up to any great extent on new models for some months, the parts activity can be closely watched.

Particular attention is paid to the cars in the factory service station and repair shop. Troubles of a service nature as distinguished from repair or wear are carefully studied and reported. Similarly, the overhauling jobs are analyzed for rapid wear, failure, accessibility and economy of repair. This is extremely important. In compiling this information we have developed a master complaint index, dividing the car up into nine groups—engine, electrical, equipment, front axle and steering column, transmission, rear axle, brakes, chassis, body and top, and miscellaneous.

These major groups are divided into from three to twenty-five sub-divisions which are the basis of our complaint file comprising cards, upon which the data are summarized. These cards are divided into from one to ten sub-complaints. All the data on cars and motor trucks of a given model, being posted on the summary cards, the final step in compiling our engineering records is completed.

WE are now in position to aid the engineering and manufacturing departments in the refinement and improvement of the product and keep the management advised from the commercial point of view, of the actual performance of the machines operating in customers' hands.

The character of the reports is as follows:

1. *Special Reports* of an analytical nature covering the entire history of any particular feature in design or chronic trouble of a specific character. In these the engineering department is provided with data from every available source on a particular subject which they wish investigated. These reports are made up either at the initiative of the technical division of the service department who realize that a certain condition is becoming serious or at the request of the management or engineering department.

2. *Quarterly Reports* covering the complete history of all machines in operation of a particular model for a three-month period. The most serious complaints are given an arbitrary value and particularly emphasize, the actual percentage of troubles being shown wherever possible.

3. *Final Report* covering the entire history of the product prepared at the end of the eighteen months' research. These reports are apt to be partly historical in character, as most of the major troubles have by this time been eliminated through action on previous reports. Two or three times a year, the traveling service men meet with the chief engineering and manufacturing executives to discuss improvement of the product.

We have three divisions of our service department handling technical matters—passenger car, motor truck and technical divisions. The first two handle all correspondence with owners, agents and traveling service men and direct the movements of the latter. The men in these divisions are technically trained and are responsible for seeing that the machines shipped are giving satisfaction. From the nature of their work they are not in position, however, to make detailed analysis or study, except on individual cars or motor trucks, of the complaints that come in.

For this reason the technical division was formed, consisting of an engineer, an assistant who acts as statistician and must be a good practical man; and a typist. Letters and reports, after passing through the passenger car and motor truck divisions, go to the technical division for analysis and summarizing. The latter division also obtains data from additional sources, but is not concerned with individual complaints of owners. Its duty is to study the history of the product from a scientific view point and present it to the engineering and manufacturing departments. In the quarterly reports, however, both the engineering and passenger car or motor truck divisions are held jointly responsible.

Success of the system is furthered by routing our service men so that the entire country is covered and systematic reports from all agencies made, and by training and placing factory men in our agents' employ who are definitely instructed as to the engineering records required.

An alternate plan to that described, having many advantages, would be to select a definite number of cars and motor trucks and follow their history and performance in every detail. This, however, does not give as comprehensive a record of the machines operating in all parts of the country, meeting the varying conditions of usage, that the other one does. As a matter of fact, we have incorporated this plan in ours as we service, principally for research purposes, all the motor trucks in the Buffalo territory.

A NOTABLE example of wonderful results obtained from a scientific study for service experience is that of the London General Omnibus Company. That this plan and the resulting design was developed a decade ago makes it all the more noteworthy. In 1905, this company began purchasing machines in large quantities. In 1907, it had operating between 1500 and 2,000 buses of ten or twelve different makes —French, German and English. It was naturally handicapped by the varying types of machines used, it had little previous experience in large fleet operation, and underlying causes of failures and troubles were not clearly understood, failures occurred practically at every part of the chassis, not excepting the frame. No regular service at first was planned and drivers were encouraged to do their own repairing at the road side. At the end of the first year more than half the vehicles were out of commission at a time. This led the company to take drastic steps.

Service stations were then equipped at four or five points in the London area at which all repairs were made and broken down vehicles were required to be towed to them rather than repaired on the streets. At the same time the company began to classify all troubles, which gradually led to an extensive study of service and repair conditions. Following this a complete system of inspection was introduced to detect incipient troubles which greatly decreased the number of machines out of operation.

The opportunity to obtain from inspection and repairs, detailed service data finally led to the establishment of a thorough service engineering department. The most efficient make of motor truck was selected for special study and one hundred of these machines were kept under closest surveillance. Every failure, the degree of wear on every part, condition of lubrication and fitting of the various parts was carefully noted and tabulated. The cost of operations and repairs was closely studied. In addition a general record was kept of the entire fleet, particularly those of other makes.

At the end of five years the company brought out a new design of its own based entirely on this experience and the machines were then manufactured by a subsidiary company. The new design was based almost entirely on actual service experience and very little on theory of design, as regards the proportion and strength of parts. As a result the number of machines out of commission was reduced from 50 to 10 per centum and finally to 2 per centum.

WITH a thoroughly developed engineering service record system working through an efficient factory service department, the manufacturer is not obliged to reply on general statements of agents or salesmen which are often exaggerated. He will discover incipient troubles and be able to make rapid change in design or manufacturing method and thus anticipate an avalanche of trouble and hundreds of dissatisfied owners. The saving in cost of catching trouble early in production is enormous. Not only is service expense materially reduced but economic production in large quantity is possible through elimination of continual "breaking in" on production to change design to overcome defects.

If manufacturers would realize the possibility of improvement and increased prestige of their product through a scientific study of service experience they would confer on men in charge of service departments the vital responsibility that I have tried to indicate.

Atterbury Promotes Phelps

The Atterbury Motor Car Company announces the appointment of Harry Phelps as purchasing agent. Three years ago Mr. Phelps joined forces with the Atterbury company. When the United States entered the war, however, he entered government service and remained for fourteen months with the army. Of this period, twelve months were spent in active service in France with the 302nd Engineers, 77th Division. This active field work added much to the practical side of his knowledge of motor truck materials and well fitted him for his present position as purchasing agent for the Atterbury company. Before coming to Atterbury, Mr. Phelps received the ground-work of his training with the Curtiss Aeroplane Company and the American Radiator Company.

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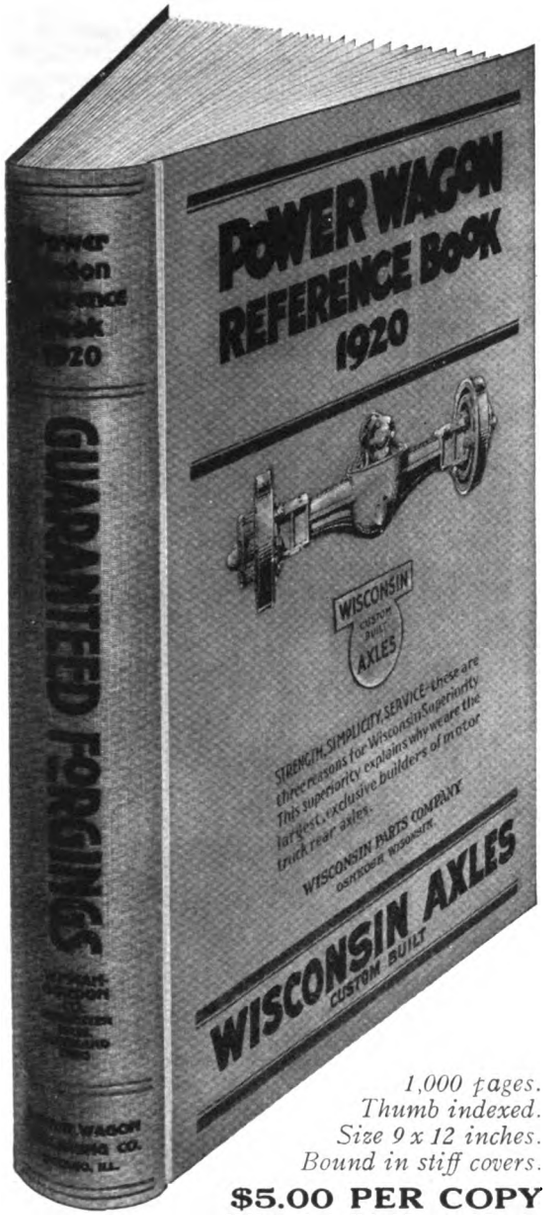

1,000 pages.
Thumb indexed.
Size 9 x 12 inches.
Bound in stiff covers.

$5.00 PER COPY
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Features of the Book

The 1920 edition of the "Reference Book" will contain 92 full pages (9x12 inches) of specifications of motor trucks, trailers, farm tractors and passenger cars. There will be approximately 134 pages of blue prints of these models, showing plan and elevation views. The 500 pages of text, in addition to the above, will afford a vast volume and great range of information to all who are interested in the production, sale or application of trucks, trailers and farm tractors.

The "POWER WAGON REFERENCE BOOK" for 1920 will be the most useful piece of trade literature ever printed. Its purpose is to supply the vital facts of the industry and, through their presentation, expand the market.

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Invaluable for Factory Executives—Engineers and Sales Managers——

THE "POWER WAGON REFERENCE BOOK," after only one year's circulation, has taken first rank among the text books of the industry. It is the most frequently consulted book of its kind in existence. It is as reliable as it is informative. Every sales manager, engineer, and factory department head should own a copy. The

POWER WAGON REFERENCE BOOK FOR 1920

will be far superior to the 1919 edition. The new book will contain about 1,000 pages, three-quarters of which is devoted to comprehensive studies of every feature of automotive design and equipment. In addition it presents 42 detailed studies of the application of motor trucks in as many branches of industry. The tables supplied in connection with these 42 studies of motor truck application represent the most valuable, painstaking, and accurate analyses of market ever presented to the trade. Nothing so useful or enlightening as these tables has ever been printed.

Engineers in need of information upon such subjects as axles, transmissions, engines, magnetos, steering gears, radiators, clutches, wheels, frames, etc., have only to refer to the encyclopaedic text section of the book, where what they seek to know is disclosed. They can see at a glance what products are on the market.

The 1920 Book Will Be Ready by the End of January

Order now—today, if possible—and save yourself the disappointment of not being able speedily to secure a copy at a time when we are hard pressed to make deliveries. Orders will be filled in rotation as they are received.

The Price is $5.00---Payable in Advance

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and in it is included one year's subscription to "THE POWER WAGON." If you are already a subscriber to "THE POWER WAGON" and wish to obtain a copy of the 1920 "Reference Book" as soon as it is ready for distribution, send us $5.00 and your present subscription to our monthly journal will be extended for the period of one year from date of expiration.

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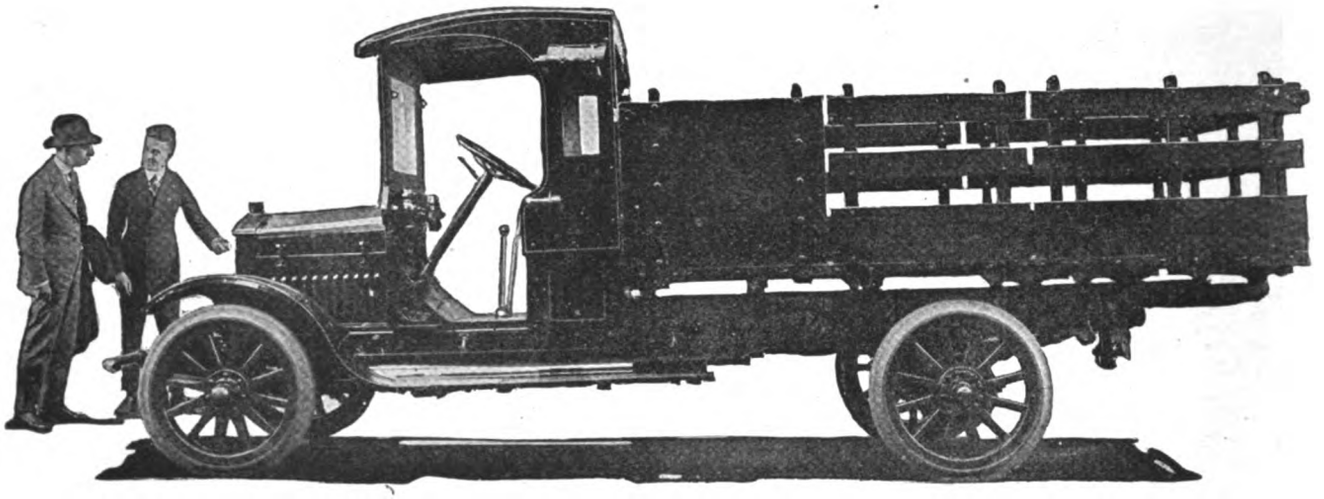


Rainier

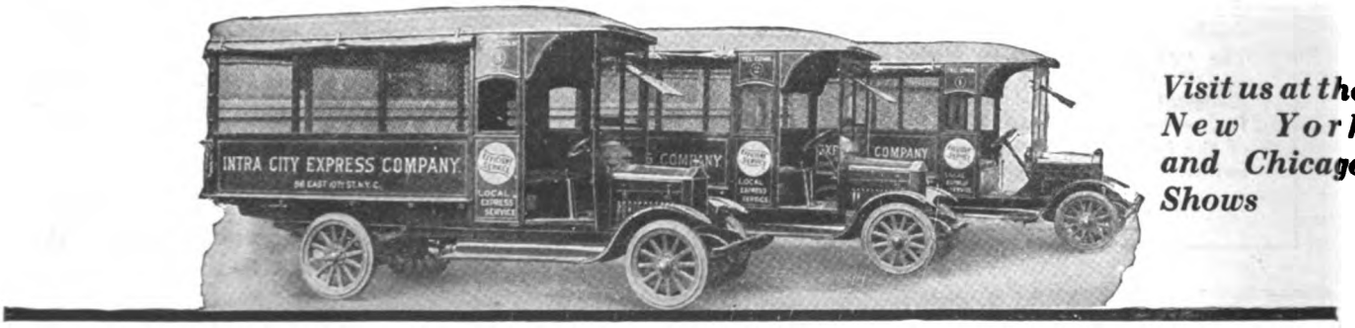
WORM-DRIVE Delivery Trucks

¾	Ton	- -	$1750
1	Ton	- -	$1875
1½	Ton	- -	$1975
2	Ton	- -	$2400

(Chassis Prices)

75% of the demand is for trucks of two tons and under—so the Rainier meets the requirements of almost three truck buyers out of every four! That is why they sell so fast.

"Little Brother of the $5000 Truck"



Visit us at the New York and Chicago Shows

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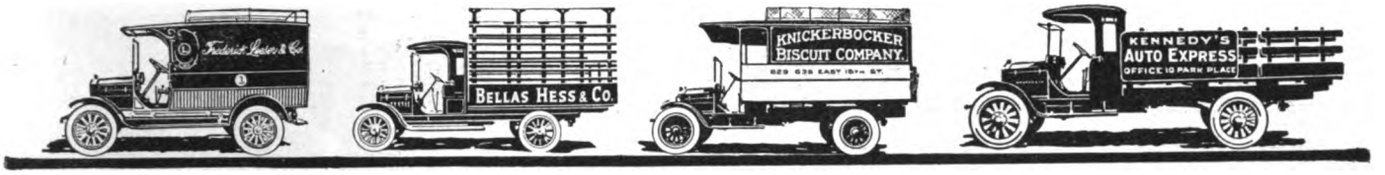


Do You Know of Any Other ¾ Ton Truck With Continental-Brown-Lipe-Timken?

MOTOR—Continental Red Seal.
IGNITION—Simms or Bosch high-tension magneto.
CLUTCH—Brown-Lipe multiple-disc, dry.
TRANSMISSION—Brown-Lipe, Model 25.
REAR AXLE—Timken-David Brown worm and gear.
SPRING CONSTRUCTION — Patented double safety shackle on front end of rear springs.
CARBURETOR—Zenith, with Stewart Vacuum System and Monarch Governor.
WHEELBASE—125 inches.
TIRES—34" x 4½" Pneumatic.
LOADING SPACE—90 inches.
$1750—Chassis Price.

A 1½ Ton Worm Drive at $1975!

MOTOR—Continental Red Seal.
IGNITION—Simms or Bosch high-tension magneto.
CLUTCH—Brown-Lipe multiple-disc, dry.
TRANSMISSION—Brown-Lipe, Model 25.
REAR AXLE—Sheldon, David-Brown worm and gear.
SPRINGS—Double safety shackle on front end of rear spring.
CARBURETOR—Zenith, with Stewart Vacuum System and Monarch Governor.
WHEELBASE—133 inches.
SOLID TIRES—Standard; Cord Pneumatic, $100 extra.
LOADING SPACE—9 to 10 feet.

This Two-Tonner at $2400 is the Best Buy on the Market!

MOTOR—Continental Red Seal.
IGNITION—Simms or Bosch high-tension magneto.
CLUTCH—Brown-Lipe multiple-disc, dry.
TRANSMISSION—Brown-Lipe, Model 30.
REAR AXLE—Sheldon, David-Brown worm and gear.
SPRINGS—Double safety shackle on front end of rear spring.
CARBURETOR—Zenith, with Stewart Vacuum System and Monarch Governor.
STEERING GEAR—Ross.
WHEELBASE—147 inches.
SOLID TIRES—Standard; Cord Pneumatic, $200 extra.
LOADING SPACE—11 to 12 feet.
$2400—Chassis Price.

Rainiers are shipped *complete with stock bodies*—saves the dealer time and trouble to have bodies built—saves him from tying up his own money. Just another feature that makes Rainier dealers so satisfied.

—and he doesn't have to take your say-so

The units which make up the Rainier plus the engineering skill used in the assembling of these units are bound to result in a successful truck. But the man who buys a Rainier worm-drive delivery truck does not have to take your say-so for its preëminence. Proof—cold, hard, honest, business facts will sell more trucks than yards of argument.

To any truck buyer whose service requires capacity up to two tons there is evidence available of Rainier success in his own line of business, under his own conditions of service.

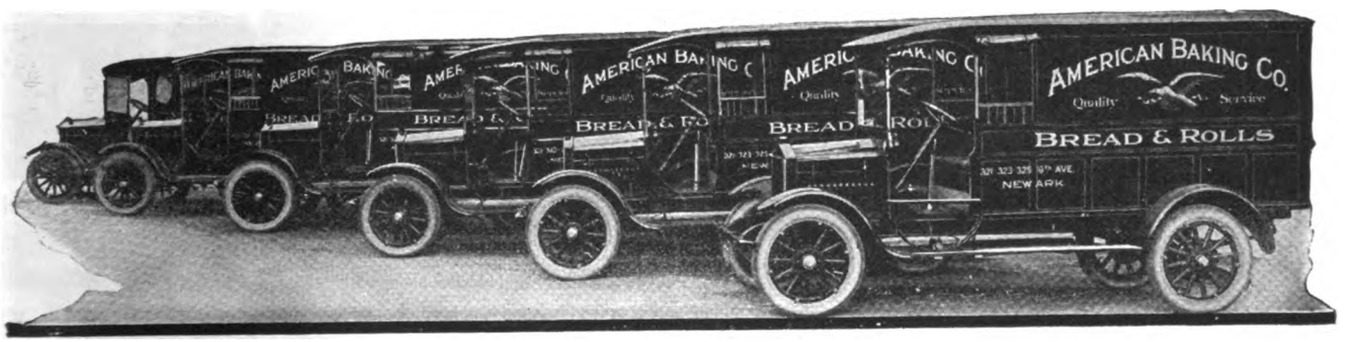
Make us prove it.

Make us also prove that Rainier dealers all over the country are happy, satisfied business men.

Rainier Motor Corporation

Address Sales Department: 225-227 West 58th Street, New York City

Factory: Flushing, Long Island, New York



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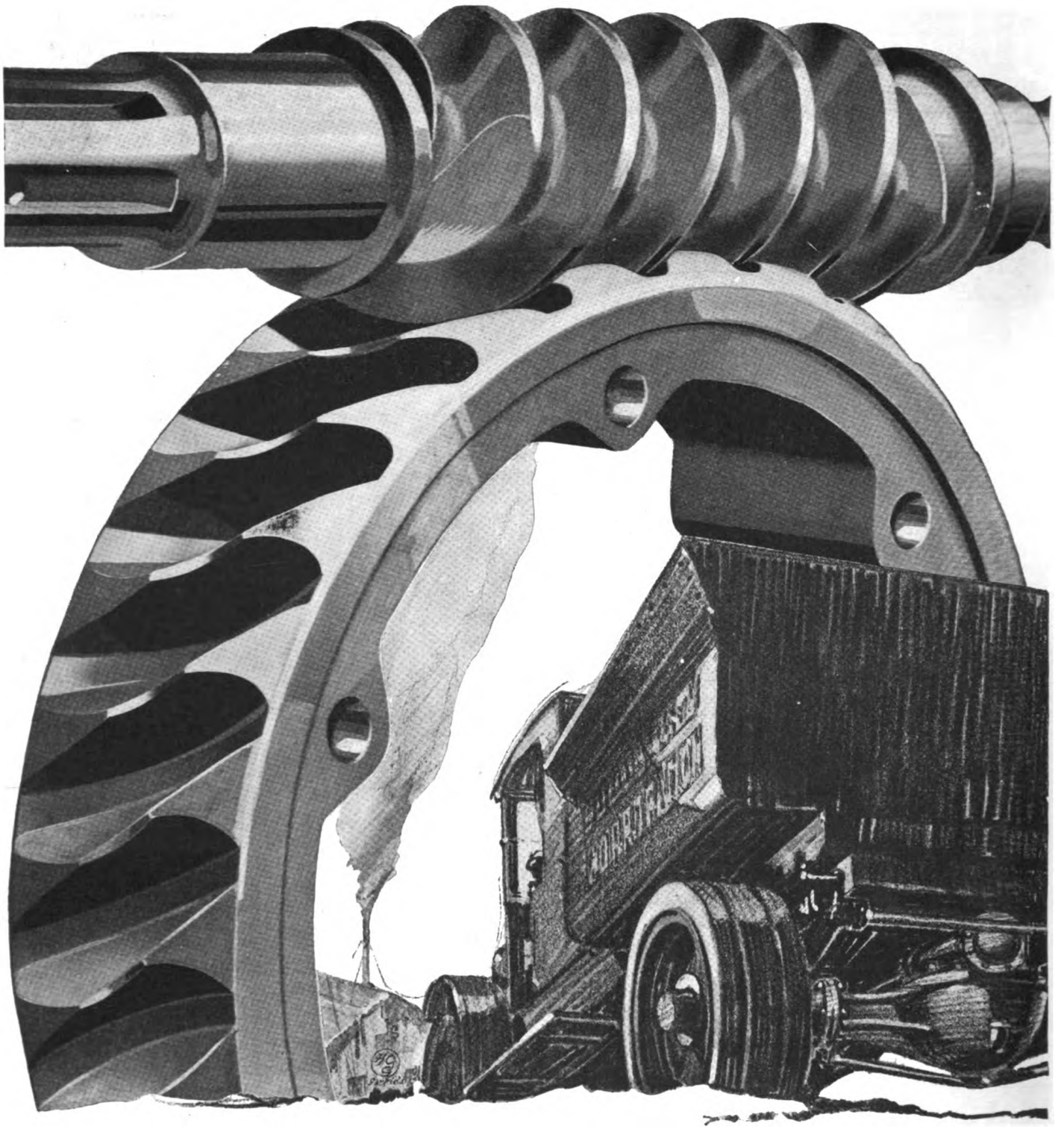

Cleveland
WORM GEARS

OTHER GEARS WEAR *OUT*. THE WORM GEAR WEARS *IN*.

Please mention "Power Wagon" when writing to advertisers.

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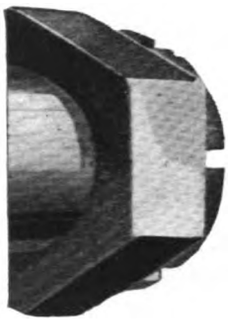
Chosen for the Big Tasks

The Dependable Worm Gear Drive



A STRIKING fact that will be observed by visitors to the truck shows this year is the predominant number of manufacturers who use the worm gear drive; manufacturers whose names stand for leadership such as Packard, Pierce-Arrow, Locomobile, Gramm-Bernstein, Federal, Etc.

And manufacturers in the smaller tonnage class whose names signify both quantity and quality production like Ford, Chevrolet, Maxwell, Etc.

The keen observer must conclude that the combined judgment of these leaders *must* be right; that he will be much safer with them than against them.

They have chosen worm gear drive because it is the most efficient and most dependable truck drive known — experience has proved it so.

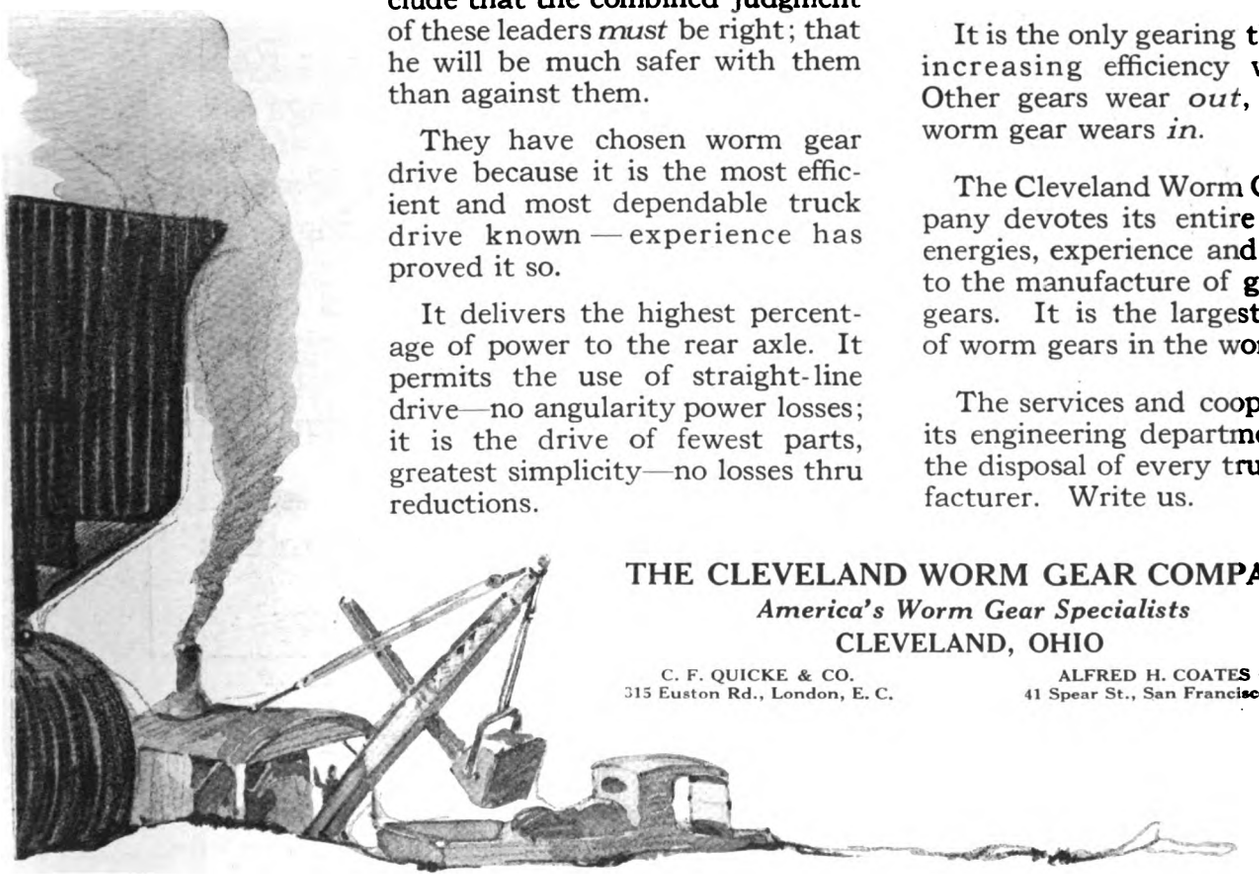
It delivers the highest percentage of power to the rear axle. It permits the use of straight-line drive—no angularity power losses; it is the drive of fewest parts, greatest simplicity—no losses thru reductions.

It is the quietest drive — it refuses to be noisy. It affords positive lubrication, greatest compactness, greatest durability, and complete protection against dust and dirt. It outlasts all other drives.

It is the only gearing that shows increasing efficiency with use. Other gears wear *out*, while the worm gear wears *in*.

The Cleveland Worm Gear Company devotes its entire facilities, energies, experience and resources to the manufacture of good worm gears. It is the largest producer of worm gears in the world.

The services and cooperation of its engineering department are at the disposal of every truck manufacturer. Write us.



THE CLEVELAND WORM GEAR COMPANY

America's Worm Gear Specialists

CLEVELAND, OHIO

C. F. QUICKE & CO.
315 Euston Rd., London, E. C.

ALFRED H. COATES CO.
41 Spear St., San Francisco, Cal.

cleveland WORM GEARS

OTHER GEARS WEAR *OUT*, THE WORM GEAR WEARS *IN*

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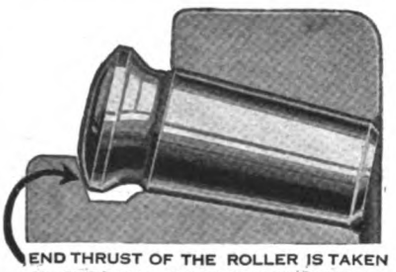
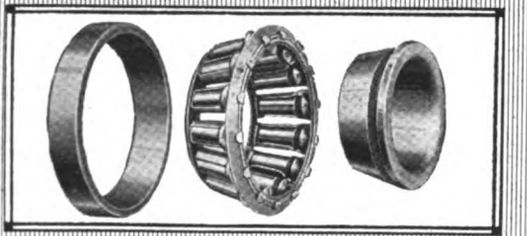
Stan-Par and PRODUCTS



END THRUST OF THE ROLLER IS TAKEN BY THE BALL END WHICH ACTUALLY ROLLS WITHOUT SLIDING.



Stan-Par Axles

Bock Taper Roller Bearings

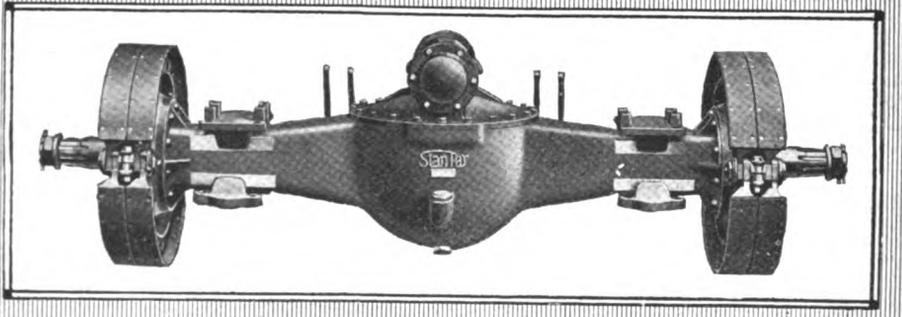
Stan-Par (Perfection) Springs

Stanweld Rims

Stanweld Tubing and Tubular Parts

Brake Rods and Rod Assemblies

Forgings



THE STANDARD PARTS COMPANY
Executive Offices, Cleveland

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the Stan-Par IDEA

Sound Engineering

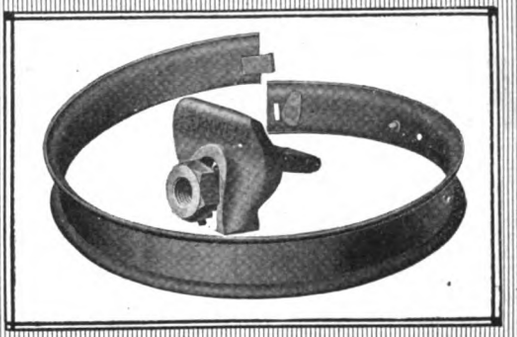
Correct Manufacturing

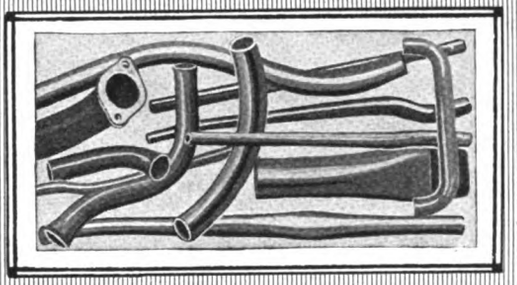
Dependable Performance

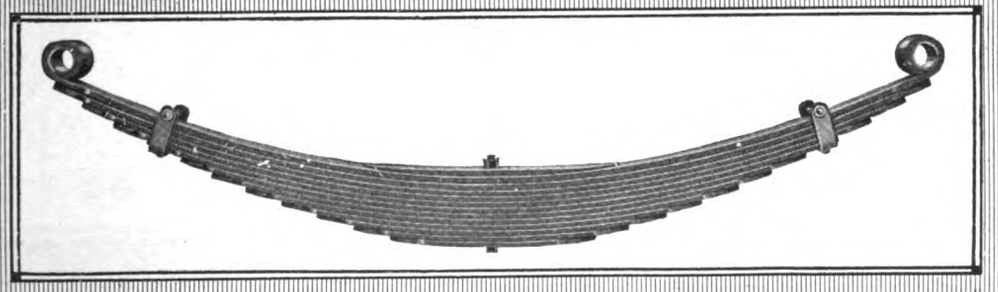
Intelligent Service

Pleasant Business Relations—

With All Proper Respect for and a Welcome to Competition







THE STANDARD PARTS COMPANY

Factories: Cleveland, Toledo, Canton, Cincinnati, Flint, Mich., Pontiac, Mich., Wheeling, W. Va., Connersville, Ind.

Please mention "Power Wagen" when writing to advertisers.

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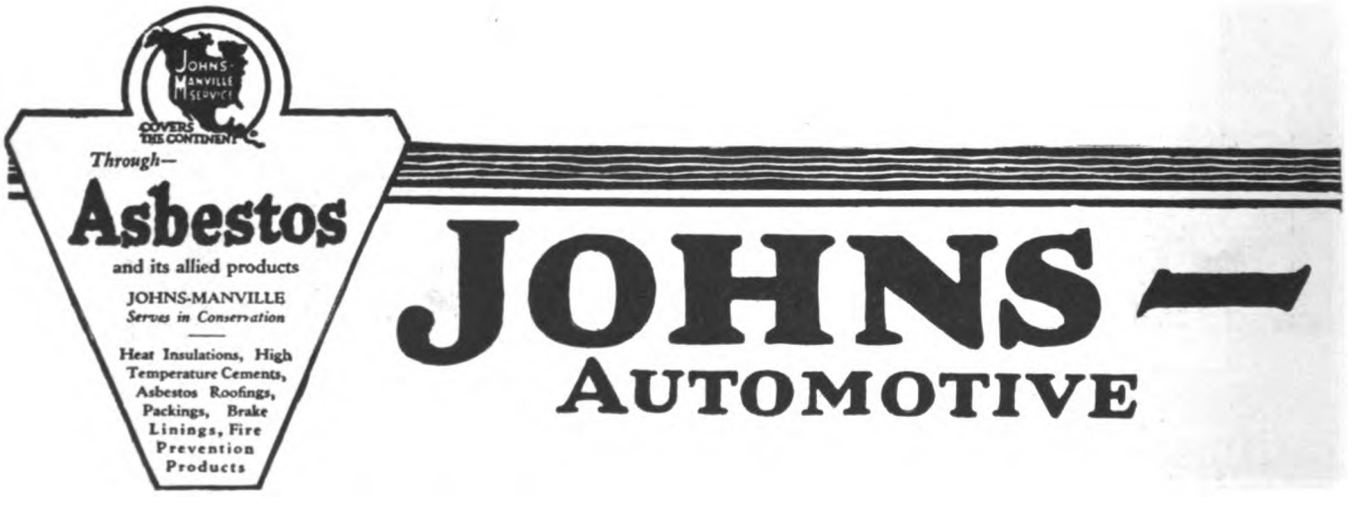
Knowing—for certain

HOW many miles? How much gas and oil? How are the tires wearing? Will the brakes hold? Is the brake-lining made of material that is unaffected by oil, water, heat or grinding wear?

You know these things for certain when you have a Johns-Manville Hub Odometer and Johns-Manville Non-Burn Asbestos Brake Lining on your truck or commercial car.

The Hub Odometer to keep track of the mileage, and all the costs that depend on "distance



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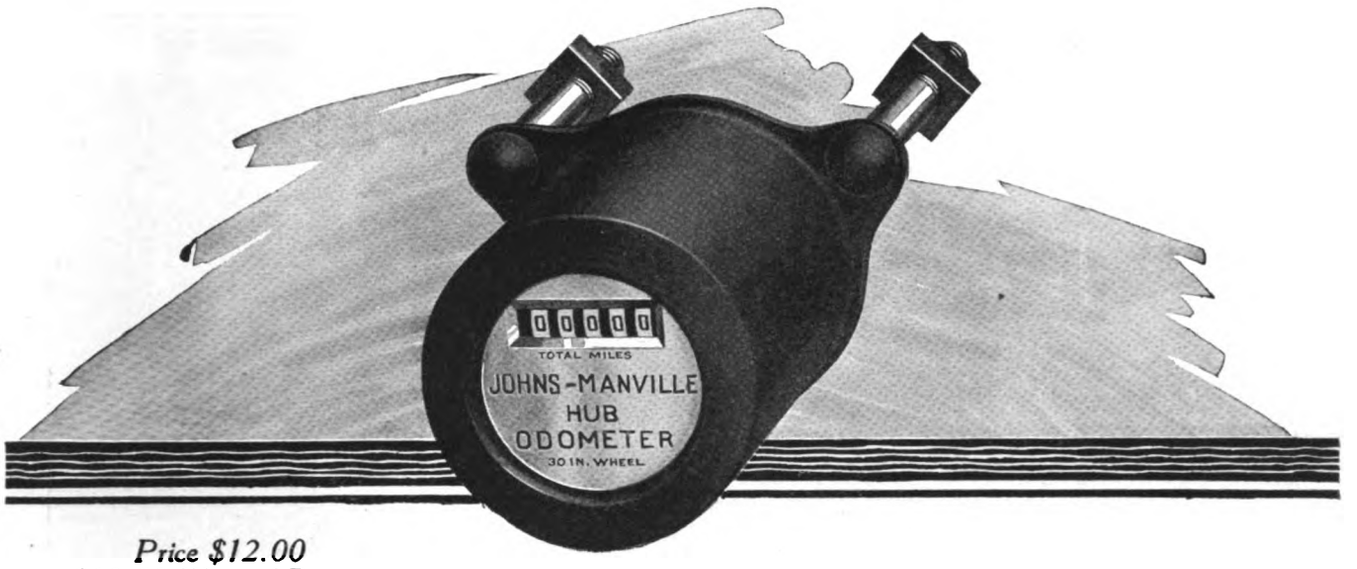


Price $12.00
$12.50 West of Denver

traveled." A sturdy, fool-proof mechanism that is indispensable to both owner and driver.

And Johns-Manville Non-Burn Asbestos Brake Lining to keep your car safe, no matter what the roads, the weather or the abuse — because it's made of Johns-Manville Asbestos. Made by our experts with fifty years' experience to back them.

Get these representative Johns-Manville Products from your garage man or dealer—or write the nearest Johns-Manville branch.

H. W. JOHNS-MANVILLE CO., New York City
10 Factories—Branches in 63 Large Cities
For Canada, Canadian Johns-Manville Co., Ltd., Toronto

MANVILLE
EQUIPMENT

Digitized by Google

Part of Case and Martin's Fleet of 63 Electrics that went through big blizzards, cold weather and deep snows.

The Electric Is a Cold Weather Vehicle

Real Blizzards, Cold Weather, Deep Snows

Remember the severe war winter of 1917-18; real blizzards, cold weather, deep snows; traffic tied up. Thousands of trucks and vehicles were at a standstill, transportation systems paralyzed—yet—during the worst of the season's bad weather Electric Commercial Vehicles were operating with excellent results.

As a particular instance among the prominent users of electric vehicles, Case and Martin Co., of Chicago, during the terrible blizzards there, were able to maintain deliveries of their famous pies; the regular routes making from 32 to 52 miles and delivering on an average of 725 packages a day and averaging 130 stops per car.

EDISON STORAGE BATTERIES with their **all steel and iron** construction were the backbone of this efficient service rendered in the severest weather, when other means of transportation was at a standstill.

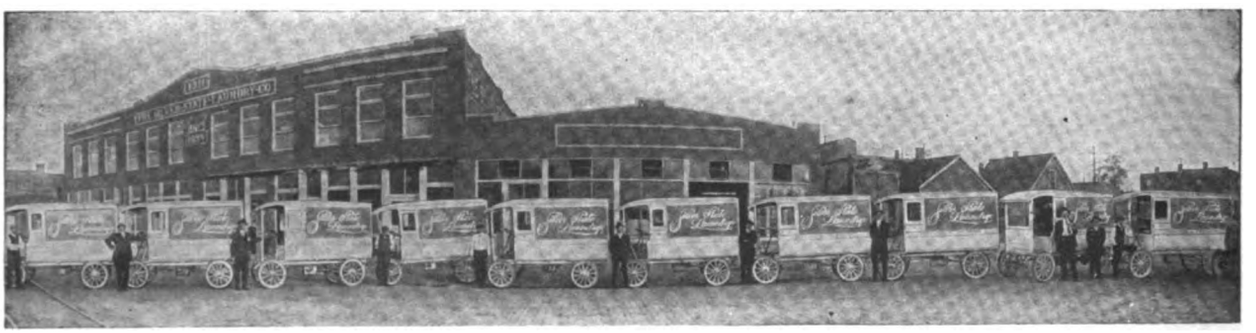
If you have transportation problems, get in line and be ready for the coming winter with Electric Vehicles equipped with DEPENDABLE Edison Storage Batteries.

Bulletin 500-I will be sent on request.

EDISON STORAGE BATTERY CO.

Factory and Main Office: Orange, N. J.

Distributors in New York, Boston, Chicago, Detroit, Cleveland, Seattle, San Francisco, Los Angeles, Denver, Kansas City, New Orleans, Atlanta, Washington, Scranton, Philadelphia, Pittsburg, Syracuse and New Haven



The light delivery system shown here operates in Denver, Colo. Similar fleets are operating in hilly Kansas City, Mo., Pittsburgh, San Francisco, etc., and are giving economical and reliable service. Edison Batteries are standard for this work.

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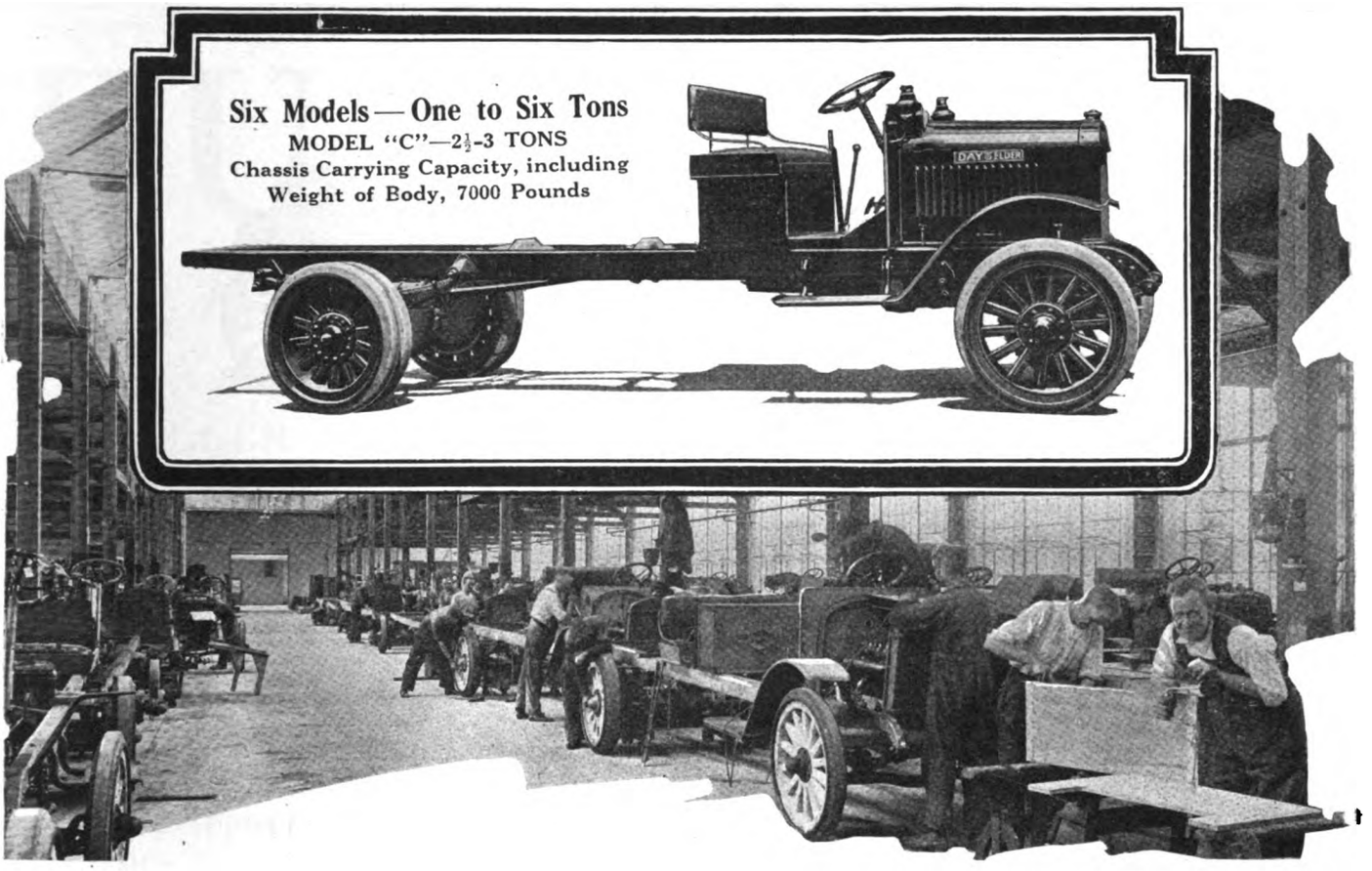

This section of the DAY-ELDER assembling plant is typical in its thriving industry of every department of the entire factory. Busy days, these, for every one who has anything to do with DAY-ELDER trucks! Maker, dealer and user, alike, wear that fraternal smile of contentment and pride that comes from the association with a master product, well made.

DAY-ELDER trucks are *built to serve*, not made to sell. While this may seem like a mere juggling of words, it expresses exactly the difference between the sturdy Model "C" shown above and the average "volume production" truck. The phenomenal success of the DAY-ELDER line of six standardized models is built on the solid rock of *correct design, the best materials obtainable, and contented workmen* —not on the personality of a master salesman or on speculative publicity.

For this reason, every DAY-ELDER truck is its own best argument. It may look very much like another truck; in fact, the two may be twins in appearance but directly opposite in quality—underneath the paint. Time, alone, is the infallible test. The first DAY-ELDER trucks made are still in operation. delivering the goods—dependably and economically.

It is the uncanny, effortless ability of DAY-ELDER trucks to render *continuous capacity service* that makes them the invariable choice on repeat orders. You can best appreciate their wonderful quality and still more wonderful value by comparing a three-year-old DAY-ELDER *in action* with the average truck rounding out its first year of service. Rolling over city cobblestones or ploughing up rocky hillside roads in the country, they arrive every time —on time.

The remarkable calibre of DAY-ELDER service was recently illustrated in a significant manner. The common deperciation charge for motor trucks is 20% per year. Our service department inquired of one hundred different DAY-ELDER users what their depreciation charges were for the *second* year of actual service. They averaged 11½%, and some confessed that their figures were a little more than the facts justified.

Dealers are realizing handsomely on DAY-ELDER trucks. Their quality is esteemed because their performance is known wherever motor trucks are used.

DAY-ELDER MOTORS CORPORATION

FACTORY, NEWARK, N. J., U. S. A.

Detroit Office: 506 Free Press Building

There is, at present, territory of great possibilities available for a few live wire distributors. Write or wire at once for particulars.

DAY-ELDER

Worm-Drive Motor Trucks

Please mention "Power Wagon" when writing to advertisers.

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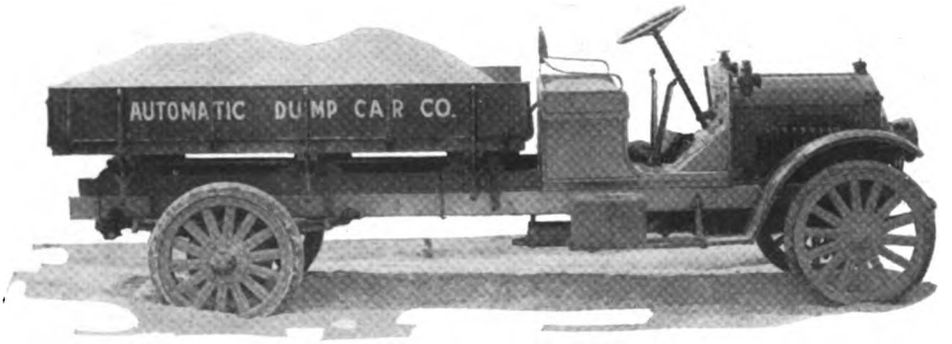
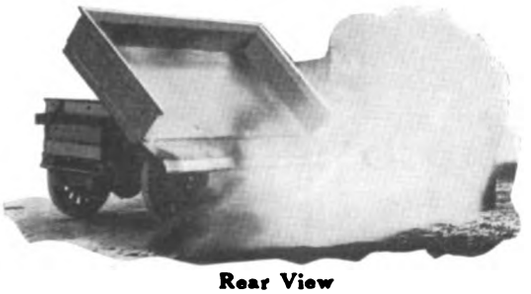


Our Slogan "Dumps Right"

Loaded

Dumped

Side View



Rear View

"Dumps Right", Dumps easily. Dumps clean. A side dump body that will carry and dump the load quicker, dump it right where it is wanted, giving a clearance of two feet from wheel to dirt,—do all this and get away in one-and-a-half minutes. Hauling experts in every line of business have welcomed the

Automatic Side-Dump Body

Fits Any Chassis

There are twelve reasons for adopting this body as standard on your truck equipment. Here they are:

12 Reasons for Buying One

1. Low body; good shoveling height.
2. Built of pressed steel; sand-tight.
3. Endgate hinged for lumber.
4. No lost space back of driver's seat.
5. Built to withstand hard usage.
6. Dumps all the load off.
7. Simple, sturdy construction.
8. No upkeep expense.
9. Takes undue stress off center of frame.
10. Adapted to all kinds of business.
11. Easily assembled.
12. Dumps load 3 to 5 feet from truck.

Write for circular showing how this Automatic Side-Dump Body will cut material hauling costs for you.

Automatic Dump Car Co.

1701 Earnsberger Avenue
SOUTH BEND, IND.

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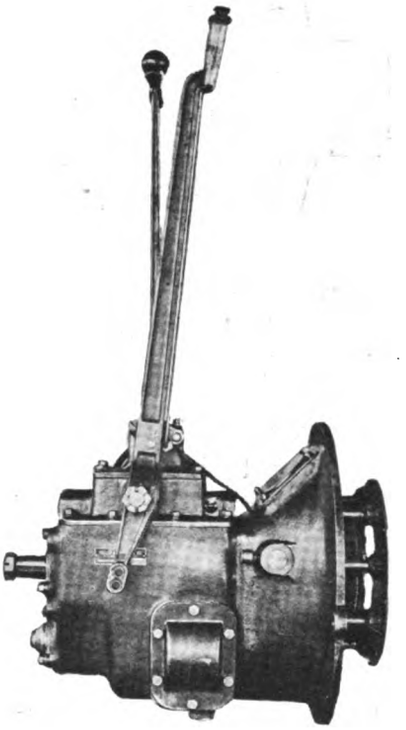
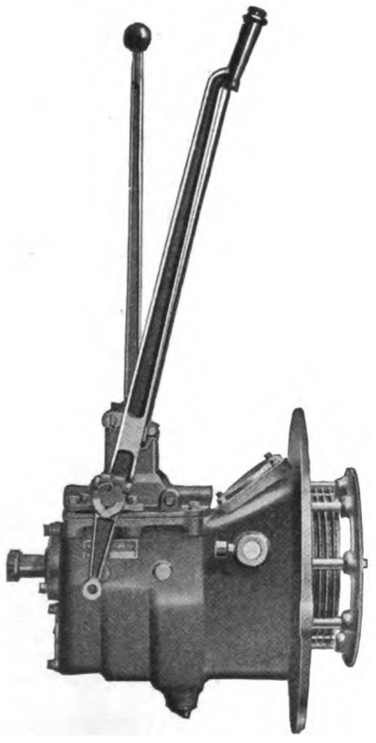
FULLER TRANSMISSIONS

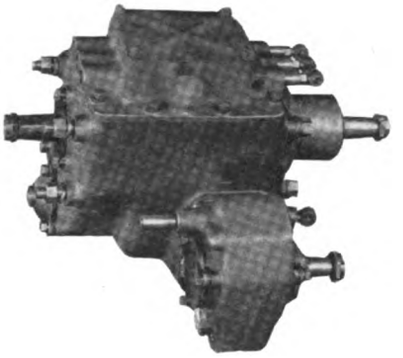
FULLER TRANSMISSION will outlast the truck because

The shafts and gears are 3½% special nickel steel, carefully heat-treated to insure maximum service. The core is very tough. The surface extremely hard, wearing indefinitely. After the shaft bearing surfaces are hardened, they are ground absolutely round then the annular ball bearings fitted. This means the shafts run perfectly true.

This is but one of the many small points that help make the Fuller Transmissions give such good service.







POWER TAKE OFF

The Power Take Off is made with the same care as Fuller Transmission and is the best means of using engine power to operate dump bodies, winches, hoist and other mechanical devices.

Fuller & Sons Mfg. Co.

KALAMAZOO, MICH.

DETROIT	Kresge Building
NEW YORK	American Circle Building
SAN FRANCISCO	Rialto Building
LONDON	Regent Street

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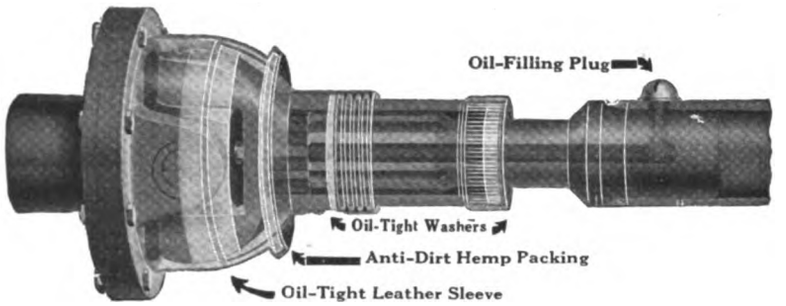
New--Practicable--Proven

A Positive Leak-proof, Oil Lubricated Universal Joint



"M&E" Universal Joint

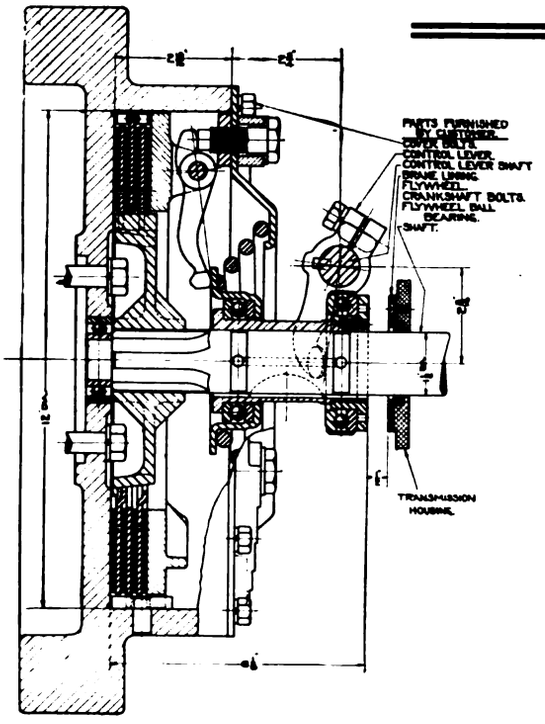
(Pat. and Pat. Pend.)

THIS device embodies all the best points worked out by Automotive Engineers for the War—U. S. and Allied program.

Severe variable speed tests in all temperatures up to 15°± have been made without change or loss of oil, or injury to the leather sleeve.

This Joint is simple, very strong, has ample bearing surfaces, hardened and ground working parts and husky pins.

We will continue to manufacture our present grease lubricated Joint, but by inserting a special sleeve, the Joint will retain oil.



"M & E" Dry Disc Clutch

(Pat. Pend.)

THESE Models 10 and 12 Clutches are suitable for any open fly-wheel or Unit Power Plant construction, and will fit any standard S. A. E. Bell Housing.

The friction surfaces are very large. The adjustment is simple and easily understood.

This clutch will wear much longer than others, with less renewal of parts, because of the comparative light pressures and large wearing surfaces; and the price is reasonable.

Visit our exhibits at the National Automobile Truck Shows, New York, Jan. 3-10, 1920 Chicago, Jan. 24-31, 1920

MERCHANT & EVANS Co

NEW YORK PHILADELPHIA WHEELING
BALTIMORE CHICAGO
ATLANTA ST. LOUIS
CLEVELAND KANSAS CITY

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General Motors Trucks

You Can Build a Profitable Business Selling GMC Trucks

Consider These Facts

Five Models, ¾ ton to 5 tons capacity.

Powerful four cylinder engine. Extra large bearings and good cooling system.

Radius rods standard construction on all models.

Multiple-disc dry-plate clutch. No adjustments or lubrication.

Four speed, alloy steel transmission in 1½, 2, 3½ and 5-ton models.

Built-up separate-unit radiator of ample capacity. Pump circulation.

Double-action brakes on rear wheels —no braking strain on drive shaft.

Brake adjustments made without tools.

Metal wheels on 2, 3½ and 5 ton models.

Solid propeller shafts. Divided drive shaft gives better running balance, eliminates shaft whipping which reduces bearing wear.

Close co-operation between dealer and manufacturer characterizes a GMC connection and makes the selling of GMC Trucks a satisfactory and profitable business.

GMC Trucks are honestly built and give maximum service at minimum maintenance cost. Owners of GMC Trucks endorse them for work under all conditions.

Dealers in GMC Trucks are connected with a permanent leader in the truck industry, for these trucks are backed by the General Motors Corporation, the strongest organization in the automotive industry.

Extensive country-wide advertising and well-rounded direct mail campaigns to prospective customers give great help to GMC dealers and salesmen.

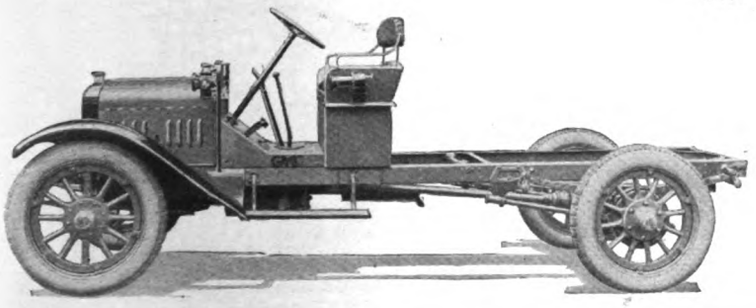
The volume of GMC Truck production makes possible delivery of trucks in sufficient number to enable dealers to carry on a profitable business.

There is territory open to reputable dealers, and full particulars will be sent to those interested.

GENERAL MOTORS TRUCK COMPANY

One of the Units of the General Motors Corporation

PONTIAC, MICH., U. S. A.



GMC Model 16, America's Standard All-Purpose Truck

(573)

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GRANT TRUCKS

Ton-and-a-half and Two Tons

A RECORD of more than three years' successful service in the hands of users stands back of Grant Motor Trucks. And back of that a corporation with ample financial resources which for five years has been one of the world's largest producers of passenger cars.

Grant Trucks have made good under all conditions. No trucks have ever been designed and built with more care, from better materials or with more generous factors of safety; and no trucks have back of them broader motor truck experience or more definite and accurate conceptions of motor truck requirements.

Grant truck dealers make money. Write for details of our proposition.

Grant trucks will be exhibited at both the New York and Chicago truck shows.

Grant Motor Car Corporation

CLEVELAND - OHIO

Please mention "Power Wagon" when writing to advertisers.

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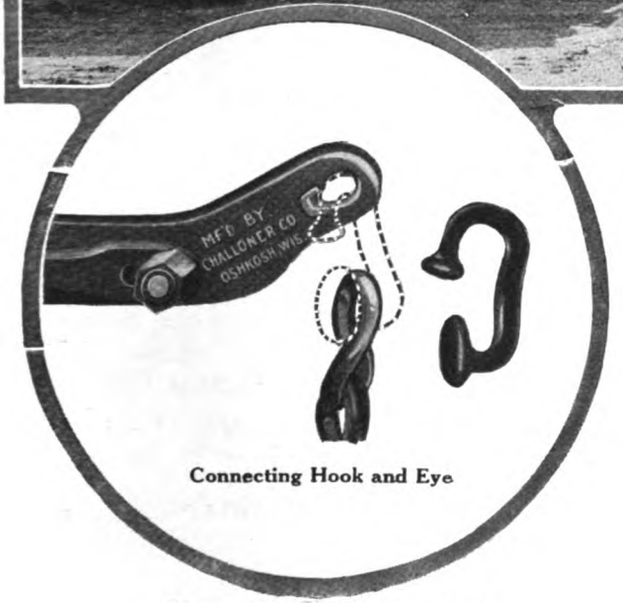

Connecting Hook and Eye

Show Truck Operators This Feature

The Giant Grip Connecting Hook and Eye simplifies the task of applying the chains. The link seats on knob end of hook, and hook is inserted into clamp eye. It falls naturally in place and cannot come loose. No spring snaps to rust. Gives play to chain and protects the tire.

Look for the "Giant Grip" Exhibits at these Commercial Car Shows:
NEW YORK—Eighteenth Coast Artillery Armory, Space Nos. 104 and 105.
CHICAGO—International Amphitheatre, Space No. 36

Traction With "Giant Grips" Increases Truck Power

AT this season truck owners are in greater need than ever of dependable traction equipment. Tires need a firm grip for icy roads and snow-choked streets.

"Giant Grip Traction Equipment" is endorsed by truck operators everywhere as a time saver. It brings trucks safely through the worst roads.

Easy to apply and remove. Chains hooked on in two minutes' time with the driver's bare hands. No tools. No jacking up truck.

"Giant Grips" are widely advertised. Fit all trucks, yet fewest models to handle. This means faster turnover—smaller stock for dealer. Dept. 25.

Challoner Company
Dept. 25 Oshkosh, Wisconsin
Established 1863

Giant Grip

Traction Equipment for Motor Trucks

Please mention "Power Wagon" when writing to advertisers

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This Truck Reduces Farm Hauling Costs

Cash In on the Farm Demand

Whether actually selling motor trucks to farmers or contemplating cashing in on the present demand, farsighted distributors and dealers will do well to affiliate with the Available organization.

This truck has proved its ability to haul farm products over rough roads without breakdown. It requires little attention and is built to stand abuse. Five sizes are built.

It is manufactured by an organization that has dealt fairly with patrons for ten years. Each truck is protected by an ironclad warranty.

Although Availables are of highest grade materials and honest workmanship, they sell at a reasonable price. Address our Chicago office today.

Available Trucks

ALL THAT THE NAME IMPLIES

Available Truck Company
Factory & General Offices
Kilpatrick and North Avenues
Chicago, Ill.

AVAILABLE ALWAYS SINCE NINETEEN TEN

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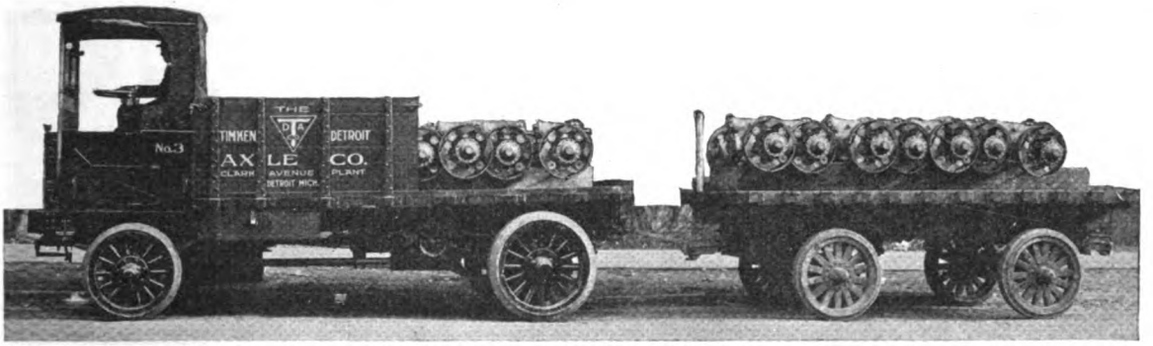

Here Is One Way the Timken-Detroit Axle Company Employs Its Fleet of Highway Trailers

Highway Pipe and Pole Trailers

2 Ton Capacity	$510
3 Ton Capacity	$655
5 Ton Capacity	$955
10 Ton Capacity	$1495

Note the Price Advantage of Highway Trailers

Think of the market for Highway Trailers.

They treble truck capacity. They haul double the load that the truck carries, increasing usefulness of truck and driver by 200%. And they do it on power that is otherwise wasted.

It is easy to sell Highway Trailers when you show operators advantages like these.

Their use by such experts of transportation as the Timken-Detroit Axle Company, the Cadillac Motor Car Company and the United States Army and Navy, which operates more than $1,000,000 worth, proves their superior construction.

Someone in your territory is going to get the profits and advantages of this valuable franchise. Write for fuller details.

Four Wheel Reversible Trailers

1½ Ton Capacity	$625
2½ Ton Capacity	$785
4 Ton Capacity	$1075
6 Ton Capacity	$1395

HIGHWAY TRAILER

EDGERTON, WISCONSIN

Canadian Distributors

GRACE MOTORS, LIMITED

Toronto Winnipeg Montreal

2 ton truck and 3 ton Highway Trailer hauling 8 ton boiler and 11 men at Sumter, South Carolina.

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THE ELECTRIC STORAGE BATTERY CO.

ELECTRIC TRUCK EFFICIENCY

Wherever the Electric Truck has been "tried out and tested" in actual service on the road, it has proved its superiority for many forms of city and suburban delivery.

Owing to the absence of elaborate mechanism the Electric Truck is very seldom off the road for repairs.

Statistics show that the average "Electric" is in operation two hundred and eighty days out of the possible three hundred per year.

The "Ironclad-Exide" Battery

Is unlike any other storage battery in the world

It is just as different in performance as it is in construction.
It is the 100% battery for Electric Truck Service—the battery that keeps the truck "on the road."

The "Ironclad-Exide"
Is powerful — Has Low Upkeep Cost
Is durable — Is Easy to Maintain
and is assembled in
Guaranteed "Giant" Jars

Address our nearest Sales Office for further information

THE ELECTRIC STORAGE BATTERY CO.

The largest manufacturer of Storage Batteries in the world

1888 PHILADELPHIA, PA. 1920

New York, Cleveland, Boston, Atlanta, Chicago, Pittsburgh, Washington, Minneapolis, Denver, Kansas City, San Francisco, Detroit, St. Louis, Rochester

Special Canadian Representatives—Charles E. Goad Engineering Co., Toronto, Montreal

Batteries are made by this Company for every storage battery purpose

THE ELECTRIC STORAGE BATTERY CO.

Please mention "Power Wagon" when writing to advertisers.

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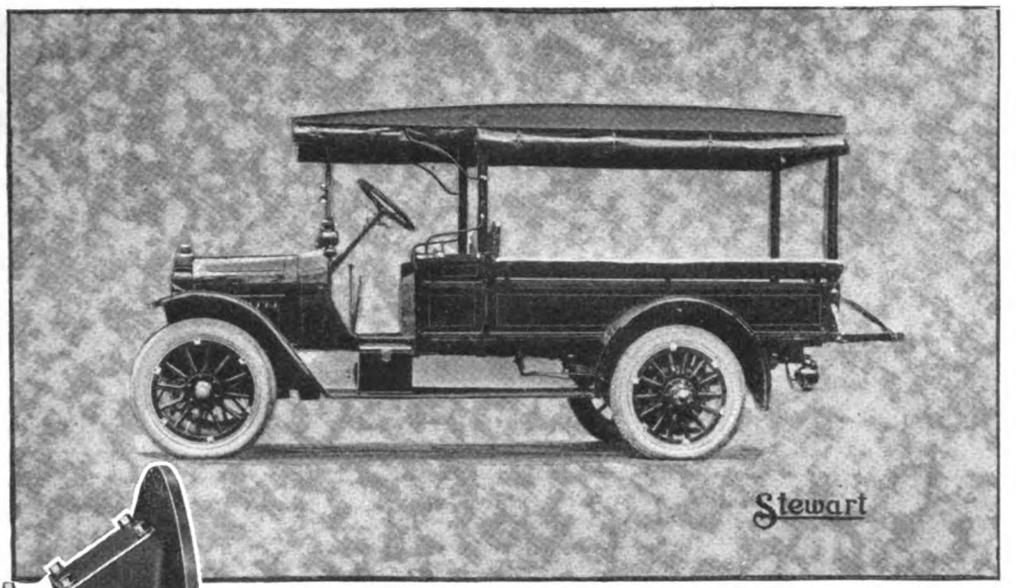
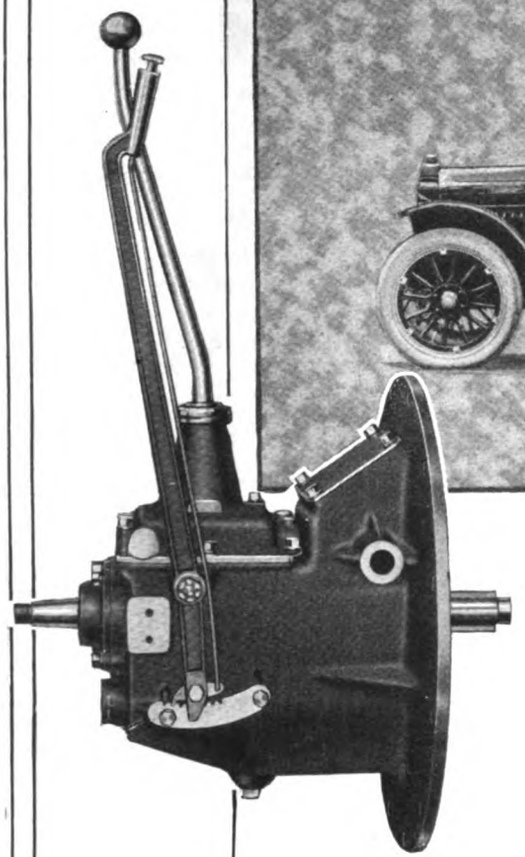
DURSTON
TRANSMISSIONS





No Stewart Truck Has Ever Worn Out

TO adopt a slogan as sweeping as Stewart's and to live up to it means that those entrusted with the design of Stewart Trucks made remarkably careful selection of the integral parts.

Durston Transmissions were chosen because they had already been proved absolutely dependable under service conditions similar to those for which Stewart Trucks were designed.

Many other truck and car manufacturers seeking reliability of vital parts have placed their faith in Durston Transmissions.

Standard Transmission models for passenger cars of various types and for trucks up to 2½ tons capacity.

DURSTON GEAR CORPORATION
32 MALTBIE STREET SYRACUSE, N. Y.

Ask The Automotive Engineer

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INC.

Why Does This Truck Dominate the New York Market?

There's a question for every thoughtful truck merchant to consider who is looking for a permanent and profitable connection. The

HURLBURT

could not today be the dominant truck in New York if its performance did not conform with its dealer's promises.

Because we believe in intensively cultivating a given area, we have turned down innumerable offers on the part of some of the best established truck merchants in various communities all over the country.

Now that our production facilities are unlimited, we are in a position to supply "America's Best" truck for a more uniform and nation-wide distribution.

We offer the Hurlburt dealer a line of four models that meet every trucking need that exists and the co-operation of a substantial organization. Our Harrisburg plant and our New York service and parts depot supply our dealers every need promptly! For the right man or group of men the Hurlburt offers a rare sales opportunity.

HURLBURT MOTORS, INC.

10 E. 39th St., New York, N. Y. Factory: Harrisburg, Pa.
Service and Parts Depot: Third Avenue and Harlem River, N. Y.

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DIETZ NEW "CONVOY" MOTOR TRUCK LAMPS

(FOR KEROSENE)

IN the Dietz "Convoy" we offer a reliable Truck Lamp made of heavy cold-rolled steel, whose every part and every line bespeak quality and whose cost can impose no handicap.

The "Convoy" is a lamp of moderate size, especially designed for trucks up to three tons capacity. These lamps will fit round or flat brackets and are furnished right and left hand in pairs. Equipped with a good optical lens, an inside oil fount, which cannot get lost, and a positive-locking door catch.

The Dietz "Convoy" Tail Lamp is the dependable rear guard used with "Convoy" Side Lamps. It is equipped with a 3½" Ruby Semaphore, showing a positive danger signal which is visible far to the rear.

Send for Catalog

R. E. DIETZ COMPANY
60 LAIGHT STREET, NEW YORK
Founded 1840

JAMES BARNES, Sales Manager, Motor Truck Lamp Department
CARTER BUILDING, ROCHESTER, N. Y.

DIETZ LAMPS

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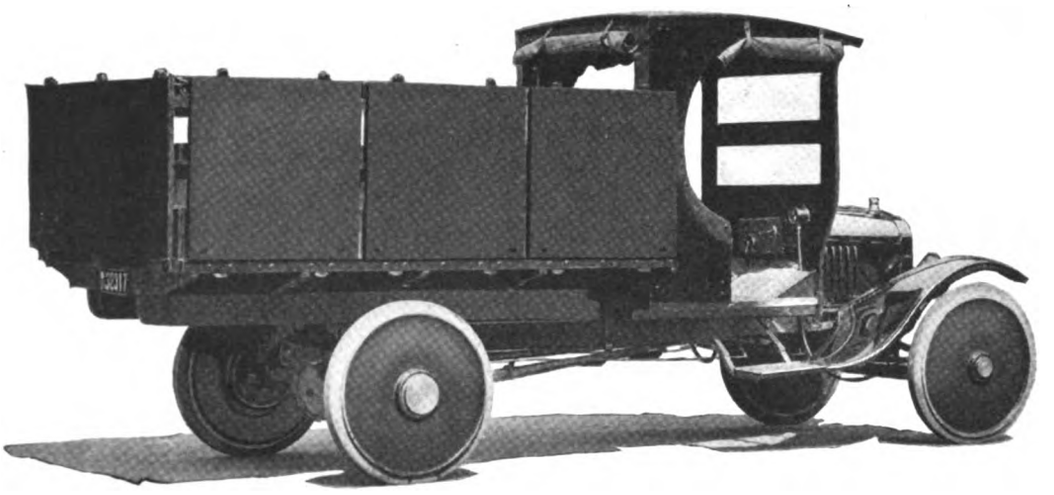
Cornfield Wheels

Pneumatic Results—*And More*—With Solid Tires



Not One Dollar for Repairs In Six Months---Overloaded Every Day

This Ford One-Ton Truck, equipped with Cornfield Resilient Wheels, had been run 3,000 miles up to December 15th, without a dollar of expense for repairs.

It frequently carries Two Tons, 4,000 pounds, and has carried 5,000 pounds. It is overloaded every day, yet shows no sign of damage to motor or chassis.

The tires are worn down just 3/16 of an inch from road abrasion, but show no damage from the excessive loads. That is because the Cornfield Resilient Wheels absorb the jar of travel.

Double Your Ford Truck Capacity Equip It With Cornfield Resilient Wheels

Cornfield Resilient Wheels are now being made in large numbers for Ford Trucks. The same wheels can be used for like capacity trucks of other makes.

These wheels so completely absorb the road shocks that your truck will have greater carrying capacity, the strain on axles is relieved, the motor is protected from vibration, the tires will be insured against the disintegrating pound on roadways.

Write for the Cornfield Booklet. It will interest engineers, dealers and truck users.

Cornfield Wheel Co., Inc., Detroit, Mich.

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The Country's 1920 Production Program Demands Trucks

INDUSTRIAL, commercial and agricultural requirements call for trucks designed, built and equipped to maintain distributing schedules irrespective of roads, loads or weather.

Kissel engineers have incorporated in Kissel Trucks unmatchable mechanical excellence and unequalled performance ability to accurately solve individual haulage problems.

The ALL-YEAR Cab, designed by Kissel, affords full protection in winter, increasing efficiency of drivers and results to owners—keeping the trucks in operation the year round.

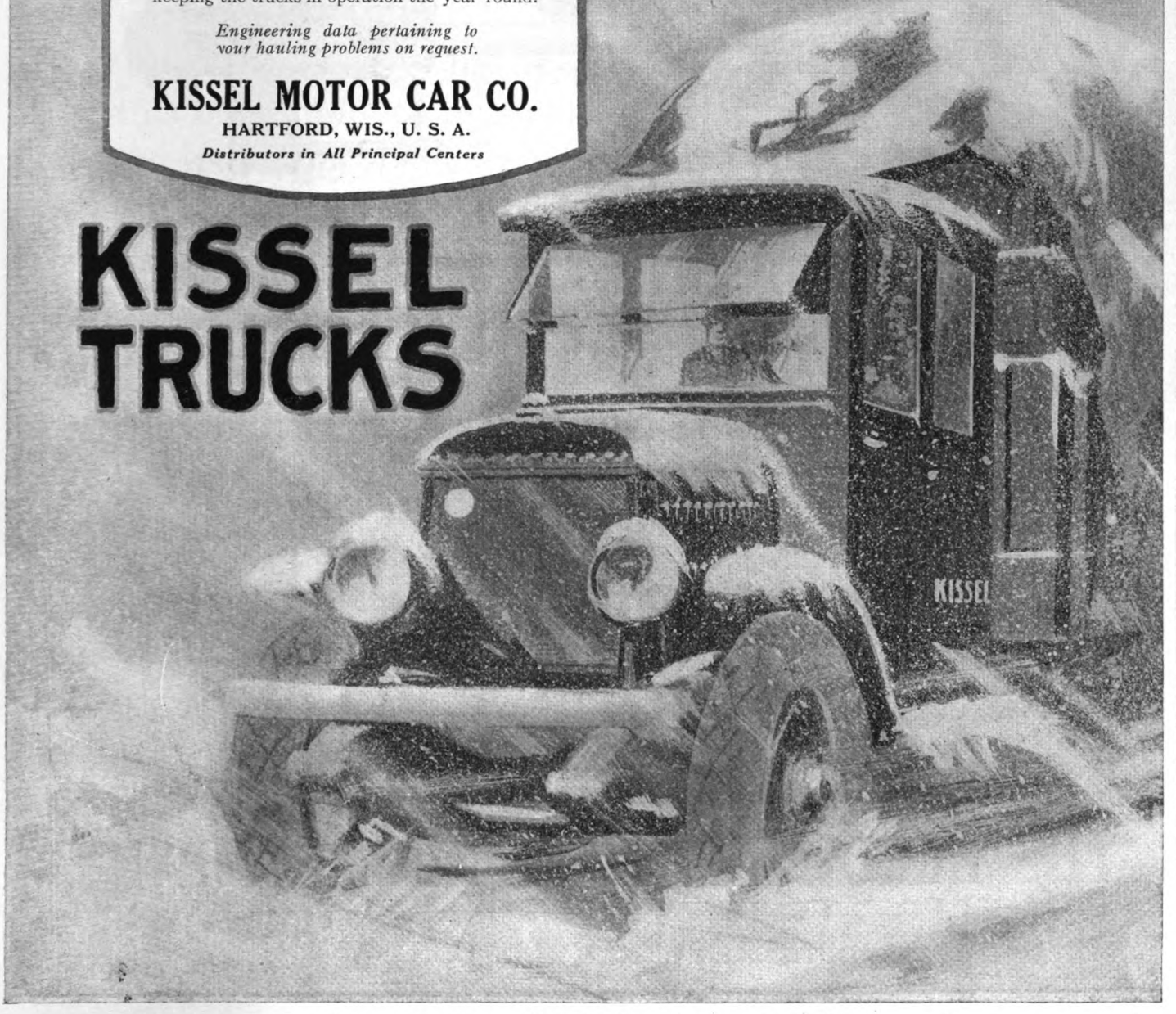
Engineering data pertaining to your hauling problems on request.

KISSEL MOTOR CAR CO.

HARTFORD, WIS., U. S. A.

Distributors in All Principal Centers

KISSEL TRUCKS



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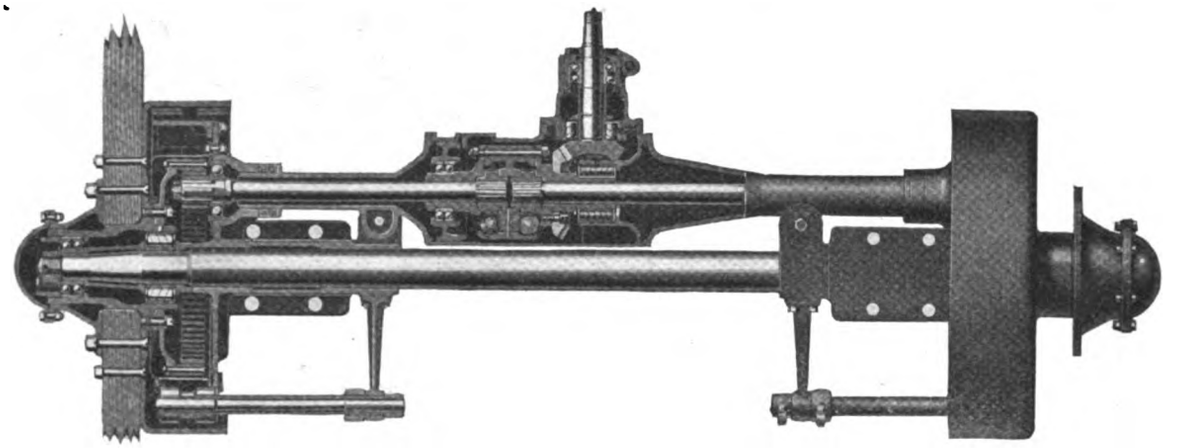
KENNEDY AXLES

FOR HIGH GRADE MOTOR TRUCKS



"BUILT TO ENDURE"

By combining advanced, improved structural features with widely recognized mechanical principles and by the use of the highest quality materials and workmanship, KENNEDY AXLES transmit the greatest possible percentage of engine power to the wheels under all conditions of road, speed and loading.

HIGH POINTS OF KENNEDY AXLES

Internal Gears enclosed and run in oil bath.
Driving torque shocks absorbed through heavy coiled springs.
Two sets of brakes, of unusually large diameter, internal expanding.
Powrlock differential standard equipment.
All parts readily accessible for inspection and adjustment.
Shafts and gears of alloy steel, scientifically heat treated.

MADE IN THREE MODELS

	MODEL 15	MODEL 25	MODEL 35
Permissible Load on Spring Pads	4,200 lbs.	7,500 lbs.	12,000 lbs.

Detailed Specifications and Literature on Request.

EXHIBITED AT NEW YORK AND CHICAGO TRUCK SHOWS

THE HERO MANUFACTURING COMPANY

23rd and Westmoreland Streets

PHILADELPHIA, PA., U. S. A.

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The trend of profitable truck business

AUTHORITIES on truck business are everywhere noting the trend of demand to the 3-ton capacity.

This is of the utmost importance to the dealer—for the sale of this size carries the greatest profit with the least service expense.

Today the F-W-D has the fastest growing market in this field. Month by month the factory is multiplying its output to fill orders coming from every part of the country.

With a service range covering that of any rear drive line from 2½ to 4 tons (and with trailer, 5 tons), with its proved saving of 40% in upkeep, with its compactness and easy operation, the F-W-D gives the dealer advantages which competition cannot meet.

We invite men who appreciate this larger opportunity in territory where the F-W-D is not represented, to send for our proposition.

A full line of F-W-D trucks will be exhibited at the New York Show, January 3-10

The Four Wheel Drive Auto Co.

Canadian Factory: Kitchener, Ontario **Dept. M** **Clintonville, Wisconsin**

Please mention "Power Wagon" when writing to advertisers.

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92 THE SATURDAY EVENING POST November 8, 1919

Sheldon AXLE FOR MOTOR TRUCKS

The Story the Hub Cap Tells

One of the most important things to look for in buying a truck is this Torpedo Hub Cap—the distinctive identifying mark of Sheldon Worm Gear Axles.

Sheldon is the axle that is built on the Locomotive Axle Principle

—the axle with the ball thrust bearing that requires no external adjustments

—the axle that is built by the pioneer worm gear axle builders of the country.

No Sheldon Axle ever becomes part of a truck until the engineers of both truck maker and Sheldon decide upon the proper axle for the truck in question.

Look for the Torpedo Hub Cap. It insures long life and daily usefulness.

Write for the Sheldon Book showing clearly the Sheldon Construction and its application to the Locomotive Axle Principle

Sheldon Axle and Spring Co.

Manufacturers of Sheldon Axles for Motor Trucks and Sheldon Springs for Automobiles and Trucks

Wilkes-Barre - - Pa.

Sheldon advertising is doing much to clear the sales path of the dealer who handles Sheldon-equipped trucks.

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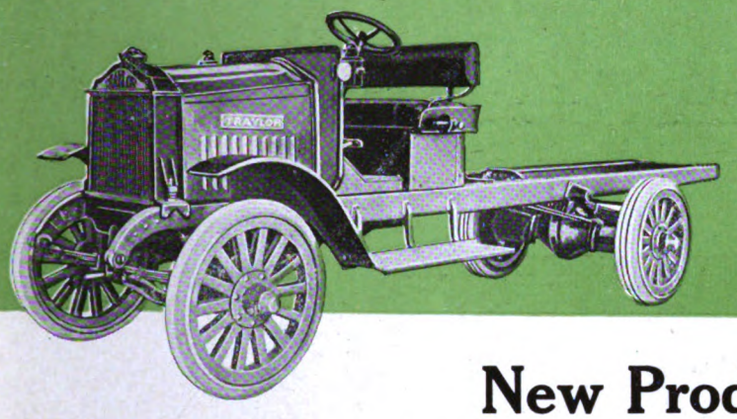
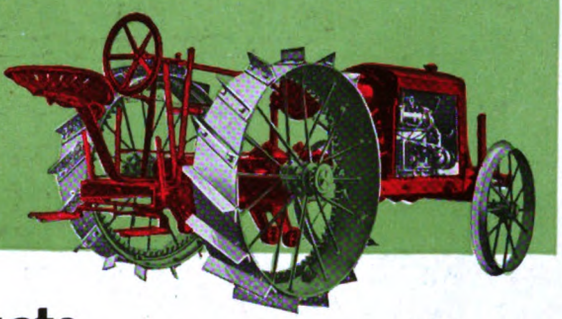
TRAYLOR

TRUCKS AND FARM TRACTORS





New Products of an Old Organization

THE Traylor Engineering and Manufacturing Company, in a sense, has been mustered out of the nation's service. Its uniform is in the closet—its rifle behind the door. Its work of producing ships, engines and shells is over. It turns NOW to the no more necessary but the much more useful pursuits of peace—the manufacture of TRAYLOR TRUCKS and FARM TRACTORS.

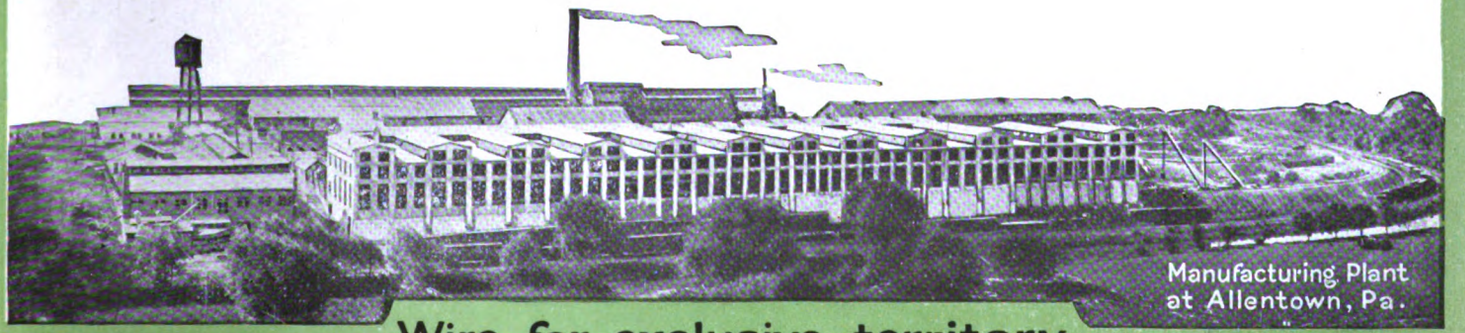
And the manufacture of these new products is the sequel to a story of industrial achievement that places the Traylor Engineering and Manufacturing Co. in the forefront of all engineering and manufacturing enterprise.

Beginning its career in a small plant at Orange, N. J., moving soon after to larger quarters at Belleville, N. J., and then moving on after only a brief stay to the present plant site at Allentown, the rise of the Traylor Engineering and Manufacturing Company to its present position of importance has been a rapid one.

The Traylor organization established for itself an enviable reputation as the builder of high grade crushing, mining, milling and cement machinery. It made the name "TRAYLOR" a hallmark of engineering and manufacturing efficiency everywhere. Its products were shipped to the four quarters of the globe.

It was logical, therefore, that the Traylor Engineering and Manufacturing Company should lay plans for the production of the TRAYLOR TRUCK. It had the plant and the organization. It had well defined ideas of what a good motor truck should be and its plans for putting the TRAYLOR TRUCK on the market were complete.

But then came the first low rumble of war —the first big demand for war equipment.



Manufacturing Plant at Allentown, Pa.

Wire for exclusive territory

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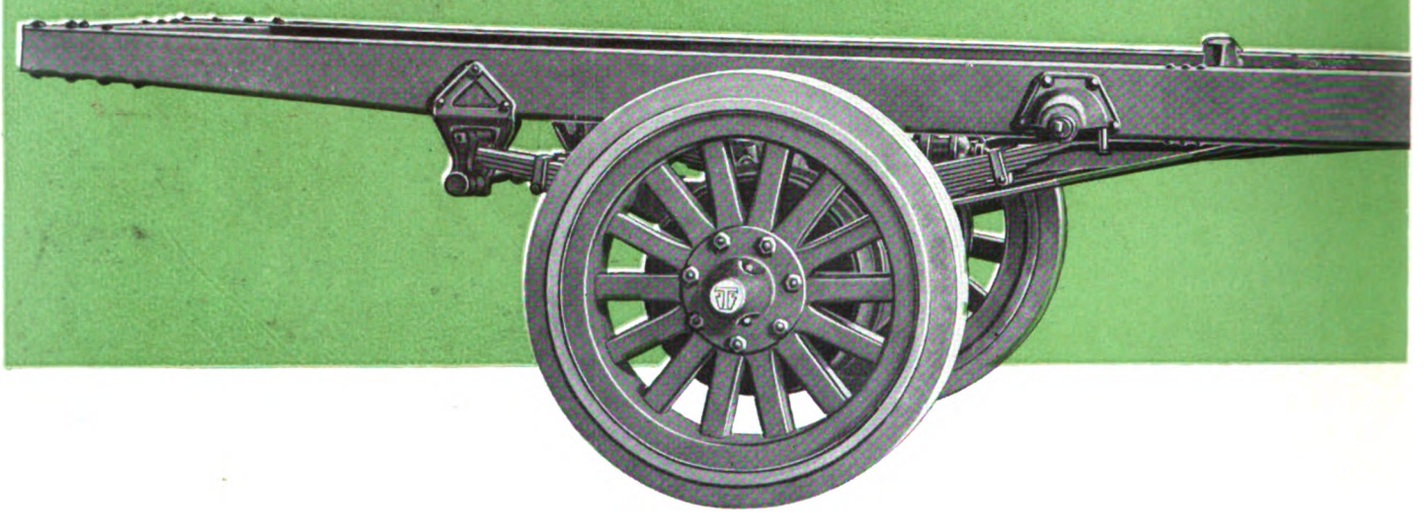
TRAYLOR TRUCKS



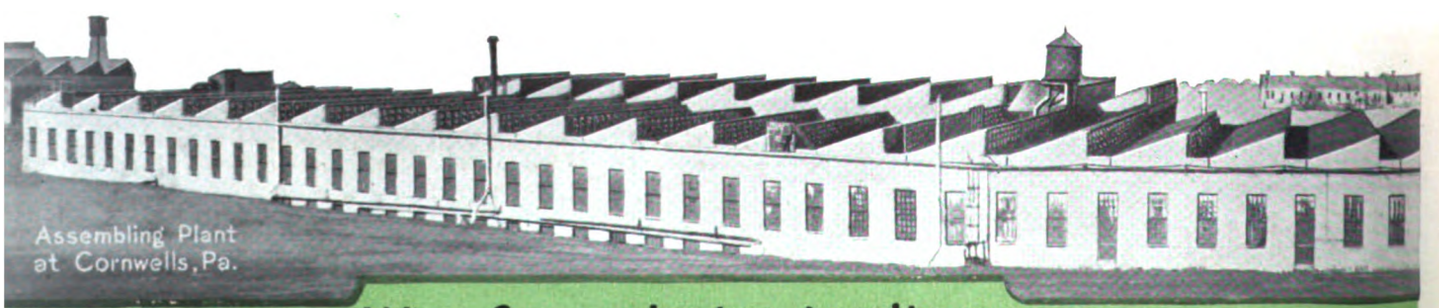
And the plans for TRAYLOR TRUCKS were laid aside.

Instead of TRAYLOR TRUCKS there were produced Traylor Shells. Traylor Shells were among the first to scream over enemy lines. The Traylor organization not only made good but made records while making good. It not only produced shells on time, but ahead of time.

But that wasn't all. America needed ships. And the Traylor organization—an efficient corps of engineers and manufacturers, but not shipbuilders—took another hitch in its belt and produced them. It enjoys the distinction of being among the last to secure a ship contract and being among the first to produce a ship. And it continued to produce ships at the rate of one a month for the duration of the war, and none came back after it left the ways!

But now that its war work is over, the Traylor Engineering and Manufacturing Company is proceeding with the manufacture of the TRAYLOR TRUCK and an added feature that has been planned and developed during the war period — the TRAYLOR FARM TRACTOR.

Under the supervision of W. C. Guilder, General Manager, formerly manager of the Mack Works of the International Motor Corporation and of the Kelly-Springfield Motor Truck Company, and W. S. Stevenson,



Assembling Plant at Cornwells, Pa.

Wire for exclusive territory

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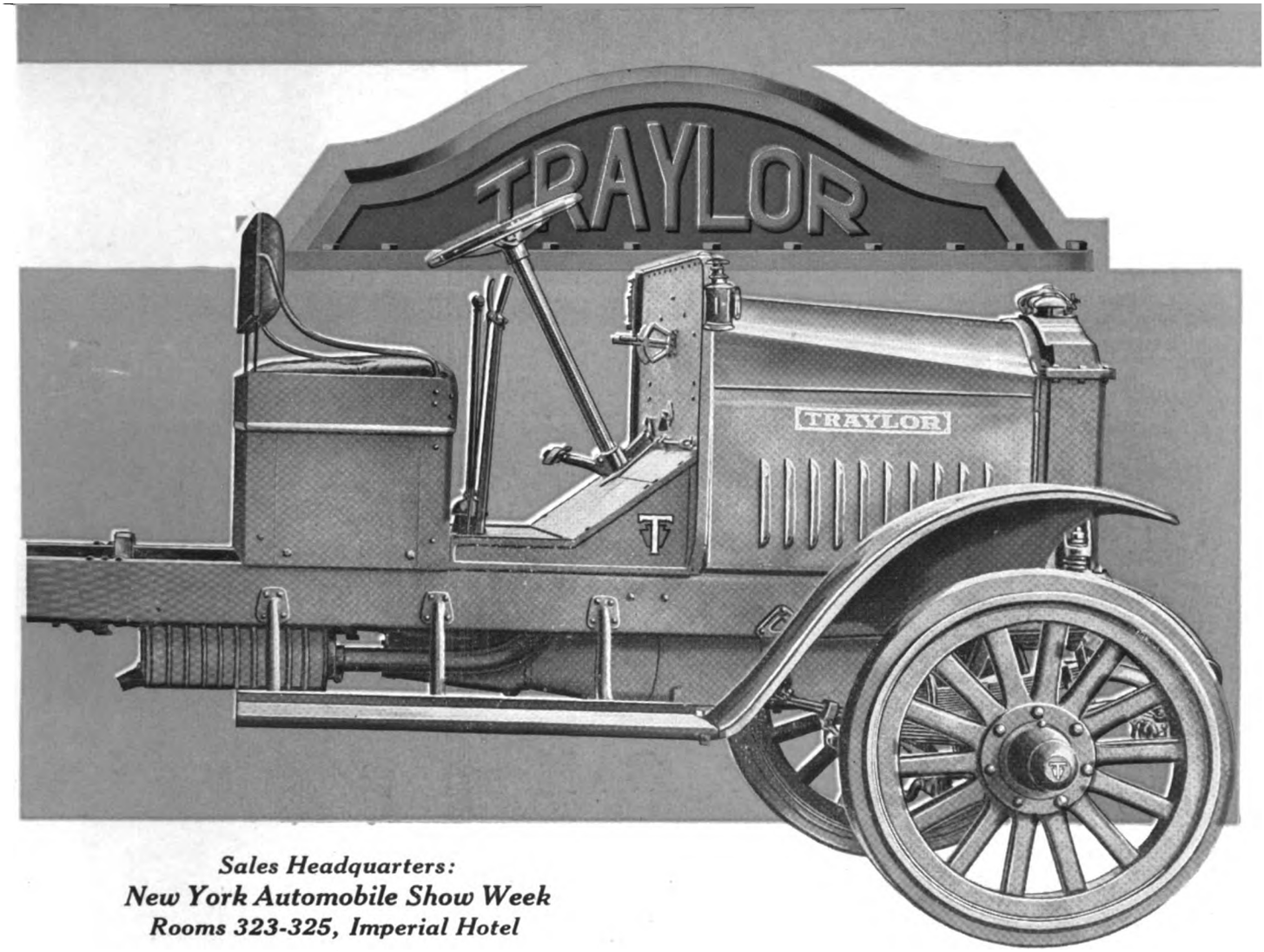

Sales Headquarters:
New York Automobile Show Week
Rooms 323-325, Imperial Hotel

General Sales Agent, for fifteen years General Sales Manager of two of the largest truck factories in the country, the TRAYLOR TRUCK and the TRAYLOR FARM TRACTOR are being produced and marketed.

The enormous plant used by the company at Cornwells for shipbuilding purposes during the war period has been released and is now in use as an assembling plant. Coupled with the Allentown plant, now used for manufacturing purposes, this gives the Traylor organization unusual housing facilities. Both of these plants are in operation now. Production has already started. TRAYLOR TRUCKS are being produced in one ton, one and one-half ton, two and one-half ton and three and one-half ton sizes.

Built throughout of standard equipment, and backed by an organization whose name insures continued production and always available service for the truck owner, the position of the TRAYLOR in the motor truck field is assured.

The construction of the TRAYLOR is all that the truck owner or the dealer could desire. It is actually the composite form of an assembly of the best equipment that the automotive industry has so far produced.

It offers unusual opportunities for the dealers who secure rights for the exclusive territories that are now open.

Wire for exclusive territory

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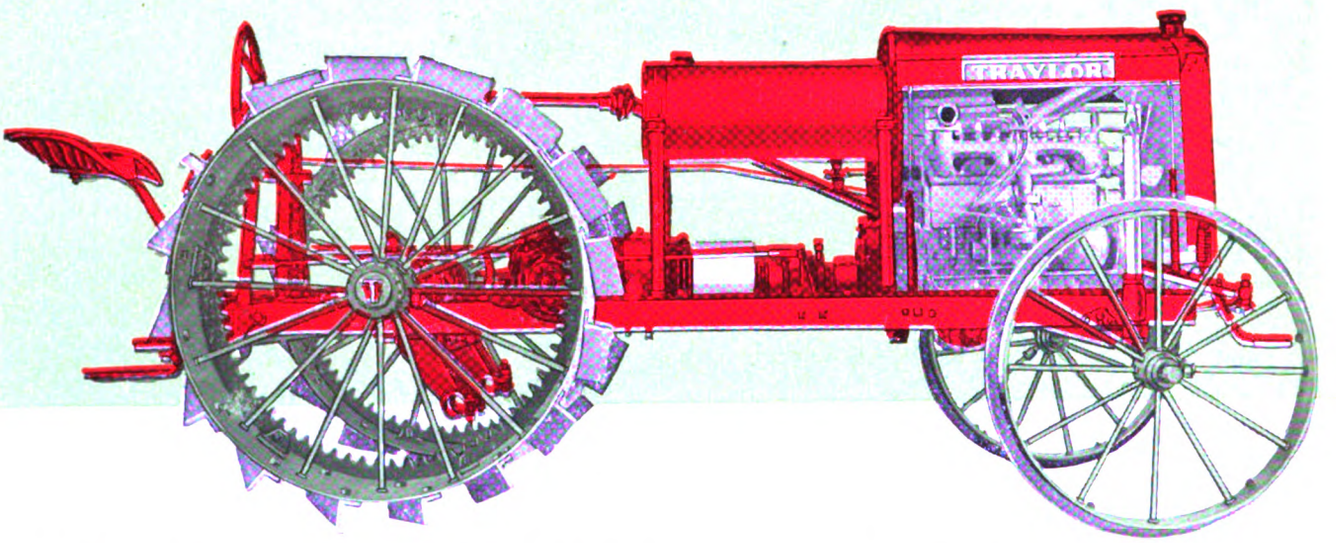
TRAYLOR

FARM TRACTORS



THE TRAYLOR FARM TRACTOR —Model 6-12—is a combination tractor and cultivator. It can be easily and quickly adjusted from its normal clearance of fourteen inches to one of twenty-seven inches for cultivating. This is an exclusive TRAYLOR feature and places this farm tractor in a class by itself.

Some of the specifications are—Rating 6 H. P. at the draw bar—12 H. P. at the belt—Weight approximately 1700 pounds.

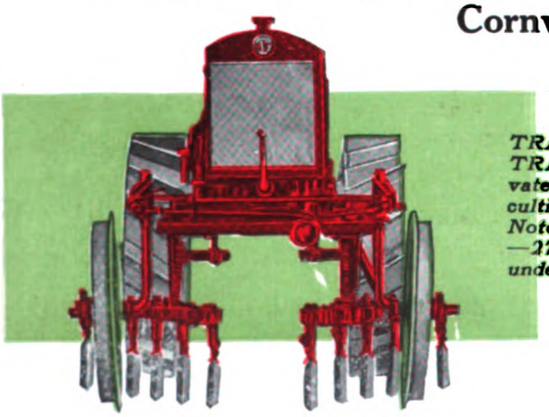
The TRAYLOR FARM TRACTOR is a light-weight tractor, economical in operation, low in price and big in possibilities for the farmer and for the dealer who secures exclusive territory rights.

Price, Model 6-12, f. o. b. Cornwells, Pa., $750

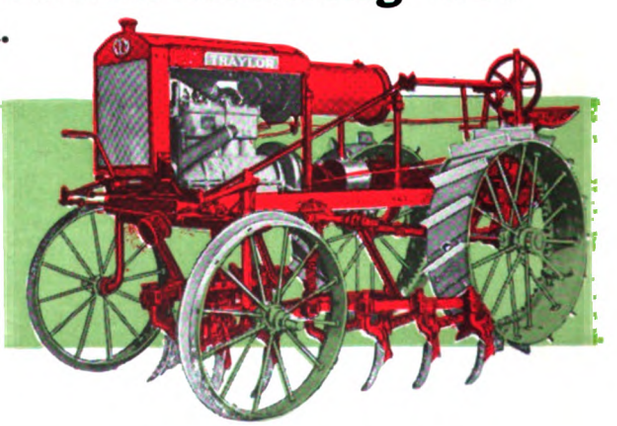
During New York Automobile Show Week, January 3-10, see the TRAYLOR FARM TRACTOR on display—7th floor, Grand Central Palace. Sales Headquarters during Automobile Show Week—Rooms 323-325, Imperial Hotel.

Traylor Engineering and Manufacturing Co.

Cornwells, Penna.



TRAYLOR FARM TRACTOR in elevated position with cultivator attached. Note the front view —27 inch clearance under frame.



Wire for exclusive territory

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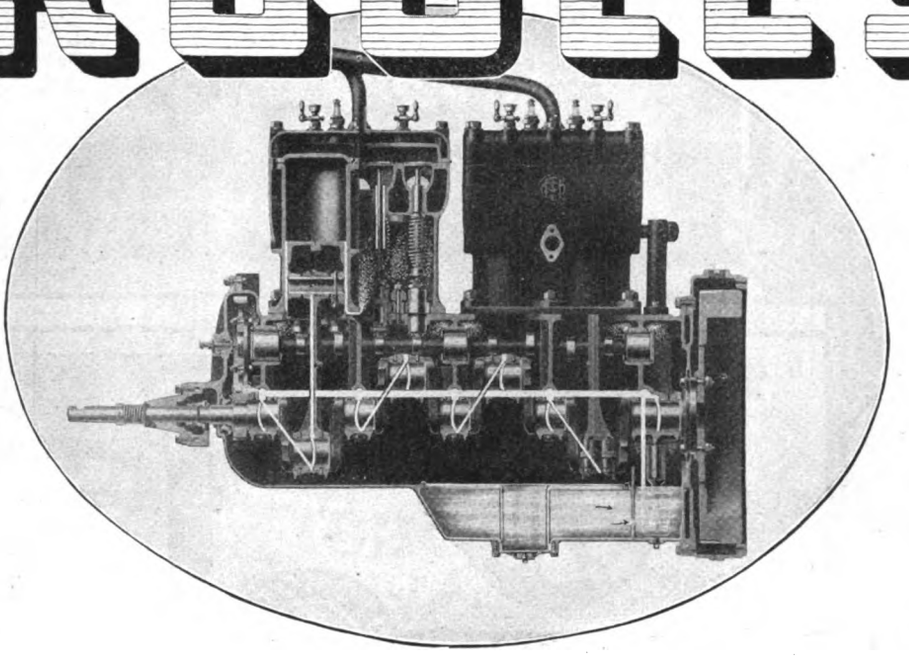
HERCULES

for Trucks and Tractors



The Oil is Forced to Every Bearing!

Because it is the only positive method to lead the lubricant to the points where bearing pressures are greatest.

Because it is the only method to insure that the undesirable heat generated by the friction of each bearing is carried away with the desirable rapidity.

Because it is the only positive method to control and regulate with that degree of accuracy necessary to insure every bearing having its full quota of oil, while positively preventing excessive oil consumption and consequent fouling of spark plugs.

Because the simple oil pressure gauge will at all times give the driver that confidence which can only come when he knows that each bearing is being properly supplied with oil.

See Hercules at the Chicago and New York Shows

In the Hercules design all this is accomplished without the added complications of separate oil pipes and connections by a simple fool-proof system of cast-in tubes and drilled oil ducts.

Remember that faulty lubrication takes its toll in trouble, time and money.

The Hercules Motor Mfg. Company
Canton **Ohio**

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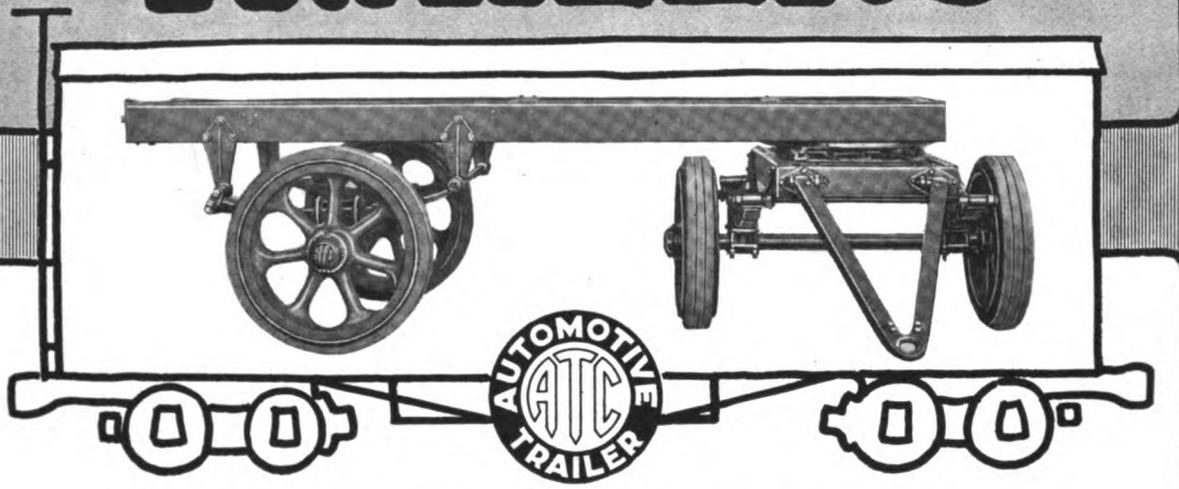
AUTOMOTIVE TRAILERS



The Freight Car of the Highway

FOREMOST
In Design and Construction

A Trailer that is distinctive because of its exclusive Mechanical Features. Built from a standpoint of delivering uninterrupted service and economy in ton-mile cost. The materials used in construction are of the best quality that can be procured in the American market.

The demand for trailer equipment is ever-increasing. All industries that have to do with commercial freight transportation are adopting trailers as a means of obtaining the highest standard of efficiency and economy. Ton mile cost is reduced to a minimum.

To the dealer of motor trucks who has made a study of commercial hauling conditions the advantage of having exclusive selling rights on a complete line of Trailers is very evident. We are offering to the dealer a very interesting co-operative sales plan.

Full particulars on our product will be given on request.

Complete Line—(4-wheel—Semi—Pole—2-wheel)—1 to 15-Ton Capacity.

AUTOMOTIVE TRAILER CORPORATION

General Office
1442 McCormick Bldg., Chicago, Ill.

Factory
Kincaid, Ill.

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Place Your Order Now

POWER WAGON REFERENCE BOOK for 1920

1920 issue of Power Wagon Reference Book will be out of press at end of January.

There is a very heavy advance subscription —so large that it will be necessary to fill orders in rotation of their receipt.

If you expect early delivery of your copy you must place your order immediately.

Price, including a year's subscription to Power Wagon, $5.00, in advance.

ORDER NOW

Please mention "Power Wagon" when writing to advertisers.

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BETHLEHEM
TRUCKS

Purdy Motor Corporation

STATE DISTRIBUTORS

TULSA, OKLA.

November 10, 1919.

Bethlehem Motors Corp.,
Allentown, Pa.

Attention of Mr. Roy Davey

Gentlemen:

When we began business we had neither capital, organization, office, salesroom or service. We hired a good mechanic 15 days after the receipt of our first carload of trucks which were unloaded on borrowed capital. At the end of thirty days we employed our first salesman. We still had no place of business.

We got busy and found a building in a reasonably good location. We got busy in other ways also and in thirty days thereafter were able to show the results evidenced by the photograph.

In the five months time since we secured a permanent location, our force has grown from one mechanic, one salesman and a stenographer to sixteen employees in office, sales and service.

Since that time we have sold eighteen Bethlehem trucks and closed three dealers contracts out in the state calling for aggregate specifications of over one hundred trucks. We now have eight regular dealers covering a very considerable part of the state.

All of this is relatively small business of course compared to established distributors, but for us, beginning with nothing in a territory where the Bethlehem truck was comparatively little known six months ago, shows a pretty fair ratio of improvement, I believe you will agree.

Trusting that this letter may be of some interest, and again thanking you for your inquiry in this connection, we are

Yours very truly,
Purdy Motor Corporation,

CVR:MM

By C. V. Reser

¾-Ton Chassis 1½-Ton Chassis 2½-Ton Chassis 3½-Ton Chassis
BETHLEHEM MOTORS CORPORATION
ALLENTOWN, PA.

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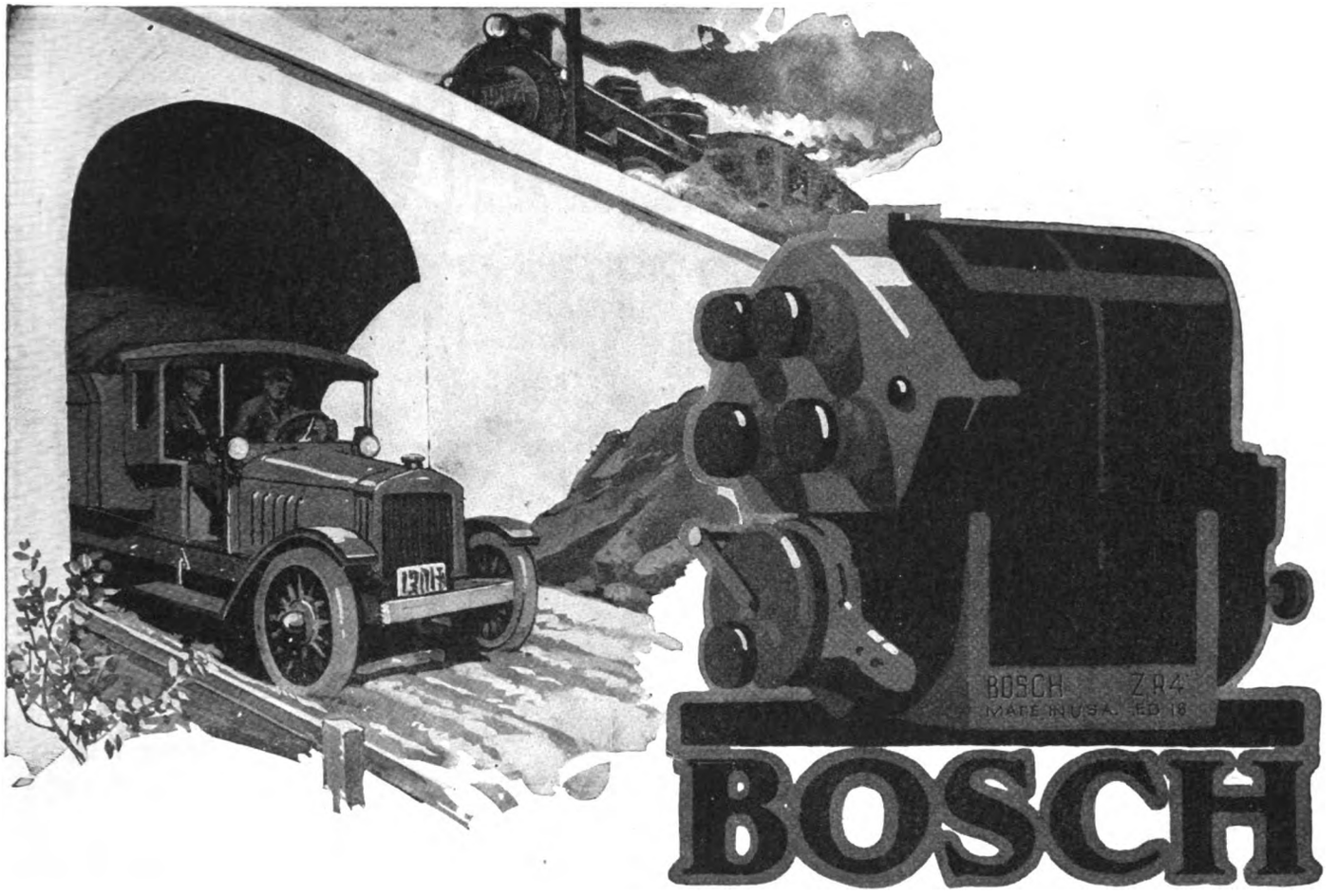

For More Truck Sales and Success

ADD Bosch Dependability to the truck you sell. In the last analysis your customers are going to decide your success or failure by the efficiency of the truck you sell them.

"Bosch Equipt" as part of your specifications will mean that all the sales power of Bosch Prestige, Bosch Service and Bosch Advertising will back up your efforts. And Bosch—"America's Supreme Ignition System" will assure you a power stream enduring in its economy and efficiency and absolute in its dependability.

Be Satisfied — Specify Bosch

AMERICAN BOSCH MAGNETO CORP.
Main Office and Works: Springfield, Mass.
Branches: New York — Chicago — Detroit — San Francisco
300 Service Stations in 300 Centers

AMERICA'S SUPREME IGNITION SYSTEM
MOTOR TRUCKS - TRACTORS - AIRPLANES - MOTOR CARS - MOTOR BOATS - MOTORCYCLES - GAS ENGINES - ETC.

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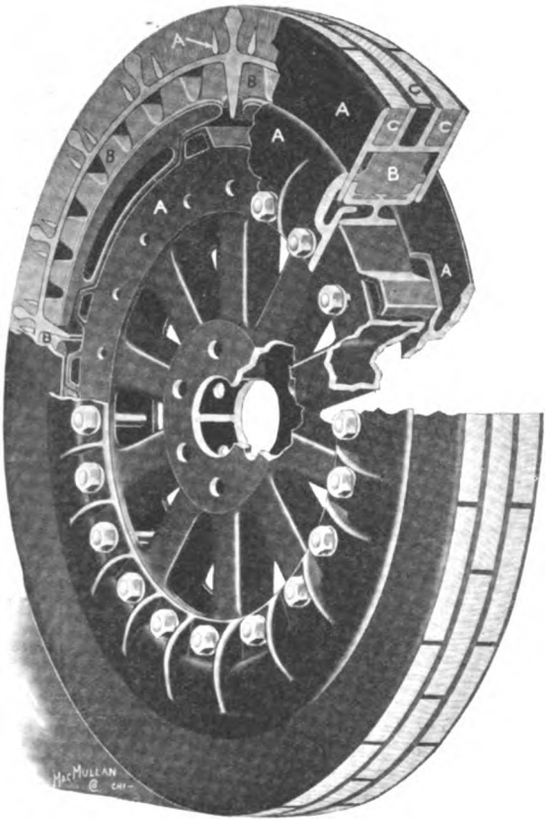
Steel Cushioned Wheels

RESILIENT TRUCK WHEELS

Mead Cushioned Wheels

A Practically Perfect Wheel for Trucks, Tractors and Trailers



This Wheel Excels in Resiliency, Efficiency, Durability and Economy.

Simple in Construction

Mechanically Correct in Construction

Vibrations and Hammer Thrusts from Road Contact are Absorbed in the Wheel

Reduces Gasoline Expense 25%

Reduces General Upkeep Expense More than 50%

Protects the Engine and Chassis against Crystallization

The Wheel Designed with a Knowledge of Traffic Conditions

A Practically Perfect Wheel for Any Truck on Any Road with Any Load

This Wheel Meets the Growing Demand of Truck Users for Reducing Upkeep, and for Protection from Engine, Tire and Chassis Troubles.

A Wheel With Perfect Drawbar Pull

This Wheel Rides with the Resiliency of Pneumatic Tires and is not injured by Oils, Acids, Salts or Other Chemicals, because the Rubber is fully protected.

Initial Investment Compensated by Reduced Aftercost Plus Upkeep

PITTSBURGH TRUCK WHEEL CORPORATION
General Offices: 624 Bessemer Building
PITTSBURGH, PA.

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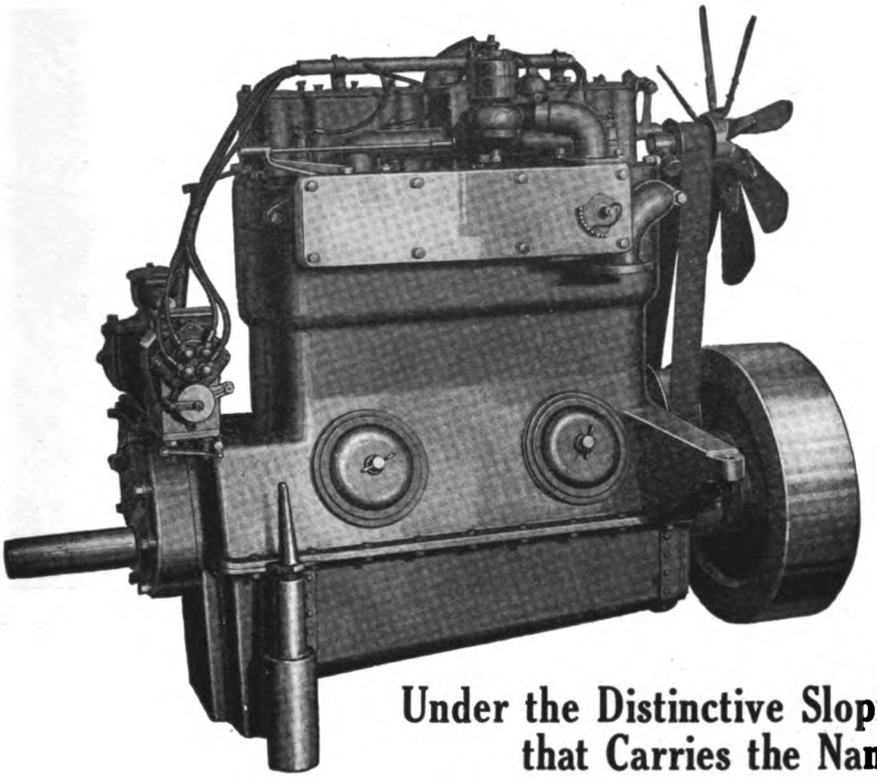

Under the Distinctive Sloping Hood that Carries the Name "International" are the Qualities that Make the Truck Go and Go and Go

Special qualities which we demonstrate in the really famous engines of **International Motor Trucks** are not all minor and technical ones. They are big factors making for truck-long-life, accounting for the years of International truck predominance, igniting the interest and then the enthusiasm of truck-dealer and truck-user.

For ninety years (less one year) this Company has been gaining in skill, guarding and never lowering standards, while manufacturing high-grade machines. For fifteen years it has been expending skill and experience in building engines for heavy-duty service. The trucks it offers are International-designed and International-built—throughout.

Today many thousands of Internationals, thickly scattered through the business world, are cutting the costs of hauling to a point that cannot now be surpassed. A chapter in their success is to be found and studied wherever there is an International at work. The owner you next run across may use one International or he may be the owner of a large fleet. One concern uses over 800 International trucks in the distribution of its products. Fleet owners analyzed and compared and *knew the facts* you may be sure, before they invested in **International Motor Trucks** as the best solution of their transportation problems.

The future for **International Motor Truck** and dealer is one of certain success. International sizes range from ¾-ton to 3½-ton. This is an opportunity of special note. Write the address below for all facts in regard to International service, dealer terms, territory, etc.

INTERNATIONAL HARVESTER COMPANY

OF AMERICA INC.

CHICAGO U S A

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Faith in Fisk— It Pays!

OTHER truck owners dared not try—

but J. W. Smith & Sons hauled this beam sixty miles over the Sierra Nevada mountains, on Fisk Solids *and made money.*

For "the best that man can manufacture"—
next time—BUY FISK

J. W. SMITH & SONS
Trucking & Freighting
Contractors
Redding, Calif.

August 20, 1919

Gentlemen:

Recently we were called upon to bid on a haul of an angle beam weighing six and one-quarter tons and a length of 60 feet. This was quite an undertaking, as it required two trucks to carry the beam.

The roads in most any direction are nothing more than hard old mountain roads, made up of twists, and turns, heavy grades and rocks which tax all the wearing parts to the utmost. They require the best in tires that man can manufacture.

J. W. Smith & Sons were the only bidders to come forward as the other truck owners could not see how money could be made after giving tires this abuse.

We hauled this beam for 60 miles on Fisk Solids and made money.

Yours truly,

(signed) J. W. Smith & Sons
By E. W. Smith

Extract from a letter by J. W. Smith & Sons of Redding, Cal., to the Fisk Rubber Company, Chicopee Falls, Mass.

FISK SOLID TIRES

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Commerce TRUCKS

The Manufacturers, the Dealers and the Public *Know*

That there will not be enough good motor trucks to go around in 1920.

The Commerce Motor Car Company intends to spread its product over a wide range of territory. We could allot our 1920 production schedule to our present dealers today.

Our policy is to have Commerce motor trucks in operation in Nation Wide Territory instead of concentrating in Trade Centers.

There is not a Commerce motor truck dealer who has not made money in 1919 selling Commerce motor trucks—if he did not make money we would not permit him to continue with us as a dealer.

We are the largest exclusive manufacturer of 1 and 2-ton trucks —also the oldest. Our 10 years of motor truck manufacturing experiences is worth something to the dealer who wants to stabilize for the future.

Every dealer knows the units in the Commerce Truck—in fact, knows the Commerce Truck, its reputation and ability to perform for the customer.

Now if you are a dealer who wants to make money and build up a business on Motor Trucks in your territory—pick out a number of cities in which conditions are parallel to your city and we will furnish the names of Commerce Motor Truck dealers at those points and you can get their opinion as to the opportunity the Commerce Franchise offers.

It is not a question of The Commerce Motor Car Company being able to merchandise its product in 1920. It is just a question—if you are a good enough business man to make money—for you to investigate the Commerce Truck and the Commerce Franchise for your territory.

Commerce Dealers Must Make Money

The Commerce Motor Car Co. Detroit, Michigan

10TH YEAR MFRS. OF MOTOR TRUCKS

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Firestone

Quick Detachable Demountable Rims

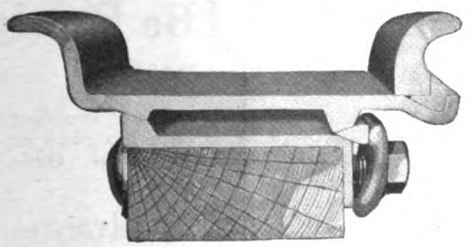
have been adopted by 60% of American Automobile Manufacturers as standard equipment for their cars.

The manufacturer knows that they give a satisfactory service which helps to maintain the reputation of his car.

The dealer appreciates that they—like other standard equipment—make sales of new cars easier and offer many opportunities for business as new equipment on old cars.

The car owner prefers them because he has learned that they make tire changes easy and get most miles out of any tire.

There is a Firestone Quick Detachable Demountable Rim for every size and type of tire and for every kind of service.



TYPE C

Continuous base detachable demountable rim for passenger cars; also made for truck users. This type of rim, in the 6, 7, 8 and 10 inch size, is the rim which has made the use of Giant Pneumatic truck tires practical for straight side tires.

The Firestone Steel Products Co.

Firestone Park
Akron, Ohio

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1,000 pages.
Thumb indexed.
Size 9 x 12 inches.
Bound in stiff covers.

$5.00 PER COPY
($6.00 outside the United States and Canada)

Features of the Book

The 1920 edition of the "Reference Book" will contain 92 full pages (9x12 inches) of specifications of motor trucks, trailers, farm tractors, and passenger cars. There will be approximately 134 pages of blue prints of these models, showing plan and elevation views. The 500 pages of text, in addition to the above, will afford a vast volume and great range of information to all who are interested in the production, sale or application of trucks, trailers and farm tractors.

The "POWER WAGON REFERENCE BOOK" for 1920 will be the most useful piece of trade literature ever printed. Its purpose is to supply the vital facts of the industry and, through their presentation, expand the market.

Subscription Payable in Advance

A Wonderful Book for "Fleet Owners" and Transportation Managers

THE "POWER WAGON REFERENCE BOOK" is consulted with great frequency by the transportation executives of the biggest firms in the country. They are greatly benefited and stimulated by its contents. Here are a few of the concerns which use it:

Marshall Field & Co.
American Railway Express Co.
Sherwin Williams Co.
Wells Fargo & Co.
Western Electric Co.
Swift & Company
Reid Murdock & Co.
Sears Roebuck & Co.
Montgomery Ward & Co.
Denver Gas & Electric Co.
Best & Company
Youghiogheny Coal Co.
A. G. Spalding & Bros.
Waterbury Sand & Gravel Co.
Standard Oil Company
Fairbanks Company
Star Motor Delivery Co.
Albert Pick & Co.
Texas Company

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The "POWER WAGON REFERENCE BOOK" is invaluable as "a buyer's guide," for it not only describes and illustrates all models, but it also gives complete information pertaining to their equipment—bodies, hoists, etc. When the buyer of motor trucks is familiar with the contents of the "POWER WAGON REFERENCE BOOK," he is practically on even terms with the seller.

The 1920 Book Will Be Ready by the End of January

Order now—today, if possible—and save yourself the disappointment of not being able speedily to secure a copy at a time when we are hard pressed to make deliveries. Orders will be filled in rotation as they are received.

The Price is $5.00---Payable in Advance

($6.00 outside the United States and Canada)

and in it is included one year's subscription to "THE POWER WAGON." If you are already a subscriber to "THE POWER WAGON" and wish to obtain a copy of the 1920 "Reference Book" as soon as it is ready for distribution, send us $5.00 and your present subscription to our monthly journal will be extended for the period of one year from date of expiration.

POWER WAGON PUBLISHING CO.
544 Lake Shore Drive Chicago, Ill., U. S. A.

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"Wolverine"
The Truck of Good Service

Expansion enables us to assume a few more Dealer Contracts

In three years the output of Wolverines has been steadily increased.

This growth has been no mushroom affair, but the result of consistent policy.

From November, 1918, up to November, 1919, the demand was so keen that we were over-sold and could not with safety take on any more Dealer contracts.

Expansion in all directions and the addition of much new equipment now places us in a position to serve you.

If you are interested in selling a truck that is a truck, built of the best units by careful workmen—and selling at a moderate price, you will want to know more about the Wolverine policy.

If we take you on as a Distributor or Dealer, you surely will receive your allotment.

Detroit Mich., Nov. 15, 1919.

AMERICAN COMMERCIAL CAR CO.,
Detroit, Michigan

Gentlemen:—Your recent inquiry as to how we like the Wolverine Truck, should have received its answer from the fact that we purchased two of them this year. We surely would not have acquired the second if the first had failed to stand the gaff.

However, for your benefit, we will carry a little coal to Newcastle by stating that our two Wolverines are certainly holding up their end in demonstrating the three virtues that make a truck an invaluable aid in holding down existing high operative costs—efficiency, economy and dependency. In the expressive vernacular of the street, the Wolverine is unquestionably a peach.

CHAMPION BEVERAGE COMPANY,
F. Schmidt, Pres.

Write or Wire for particulars

American Commercial Car Co.
DETROIT, MICHIGAN

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Denver Gas & Electric Co.
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Youghiogheny Coal Co.
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Texas Company

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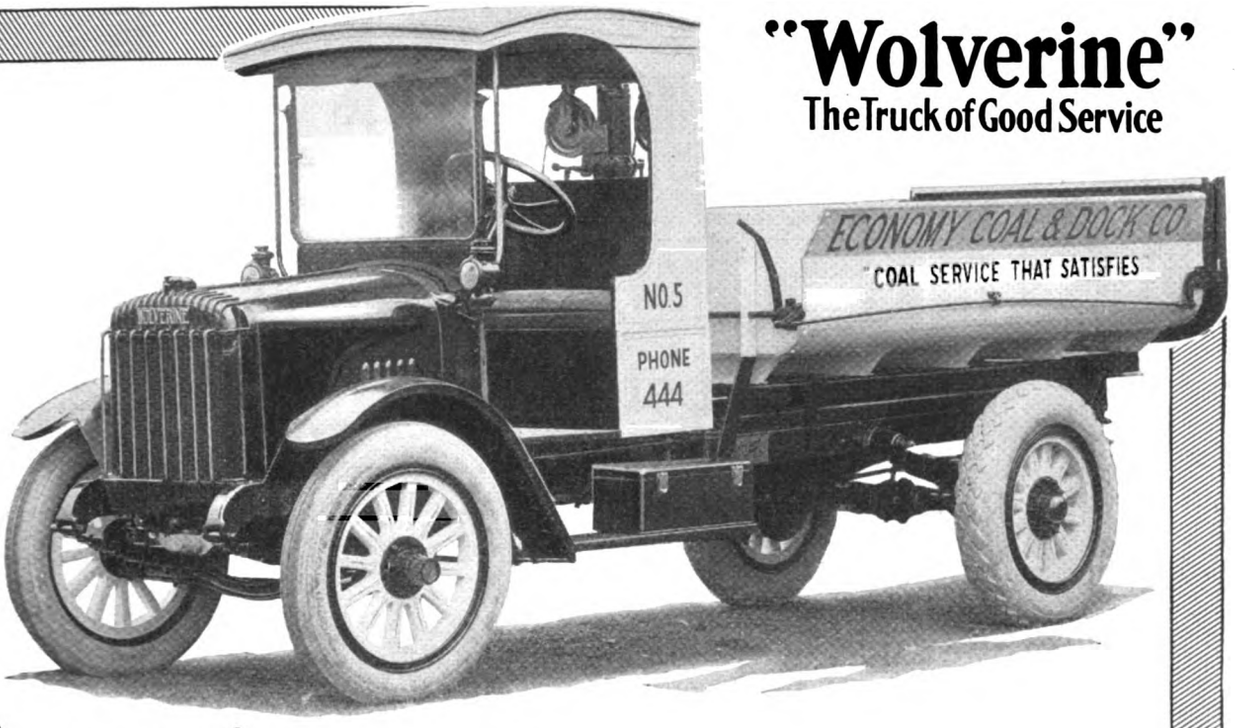

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CHAMPION BEVERAGE COMPANY,
F. Schmidt, Pres.

Write or Wire for particulars

American Commercial Car Co.
DETROIT, MICHIGAN

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REO

A Perfectly Balanced Line

Reo still leads in volume of output of Pneumatic Tired Motor Trucks.

We said trucks—not little delivery cars.

We are turning out more than 100 Reo Speedwagons per day now—and have been going at that rate for some time.

Still the demand is fully three times the possible supply of Speedwagons.

With this great leader in the commercial field and the new Reo Six in the passenger car division.

Reo distributors and dealers now have an all-year-round line—and a perfectly balanced one at that.

There never are any "Lame Ducks" in the Reo line—each model is a leader in its class.

The Reo Franchise becomes more desirable from year to year.

Reo Motor Car Company
Lansing, Michigan

"The Gold Standard of Values"

Please mention "Power Wagon" when writing to advertisers.

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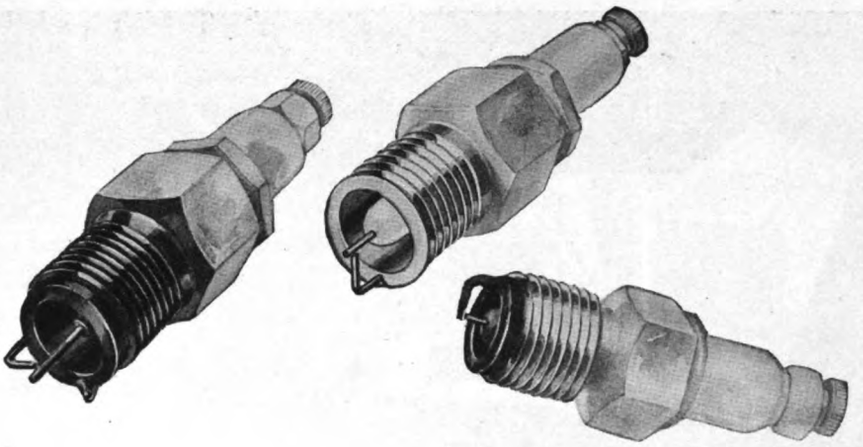


Inlands and the spark plug test

The owner of an Inland-equipped truck reads the results of the Inland spiral cut every time he looks at his spark plug.

If the carburetion is perfect and there is no oil leaking through, there will be only a light, reddish tinge on the porcelain of the plug.

If the carburetion is poor, there will also be a dry, flaky soot caused by surplus of carbon.

But, unless the cylinders are scored, there will be no black, greasy gum from the leakage of oil.

The Inland spiral cut makes possible a one-piece piston ring—a ring that is gas-tight and oil-tight.

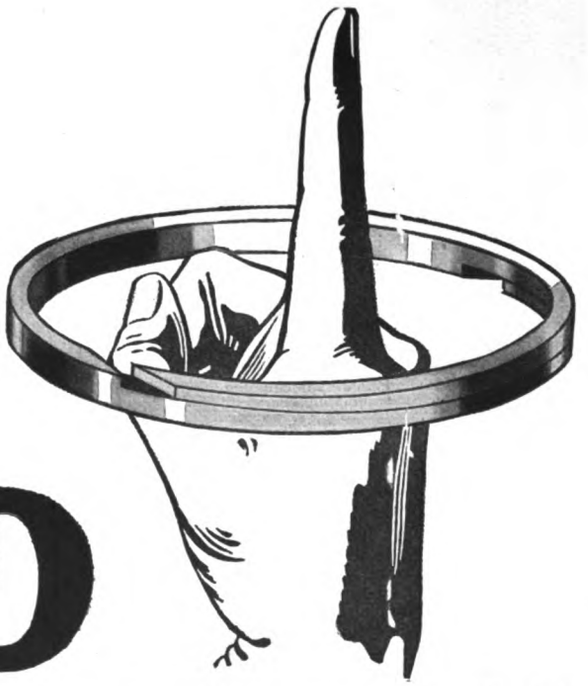
Its tension not only holds it together as a solid unit on the piston but also insures a snug fit against the cylinder walls.

If you find your spark plugs covered with a black, greasy gum, look to your piston rings.

Samples on request to dealers, importers, wholesalers and manufacturers.

Inland Machine Works

1650 Locust St. St. Louis, Mo.



INLAND ONE-PIECE PISTON RING

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More than 16,000
Maxwell Trucks
are now in use;
12,000 more will
be built in 1920

Maxwell

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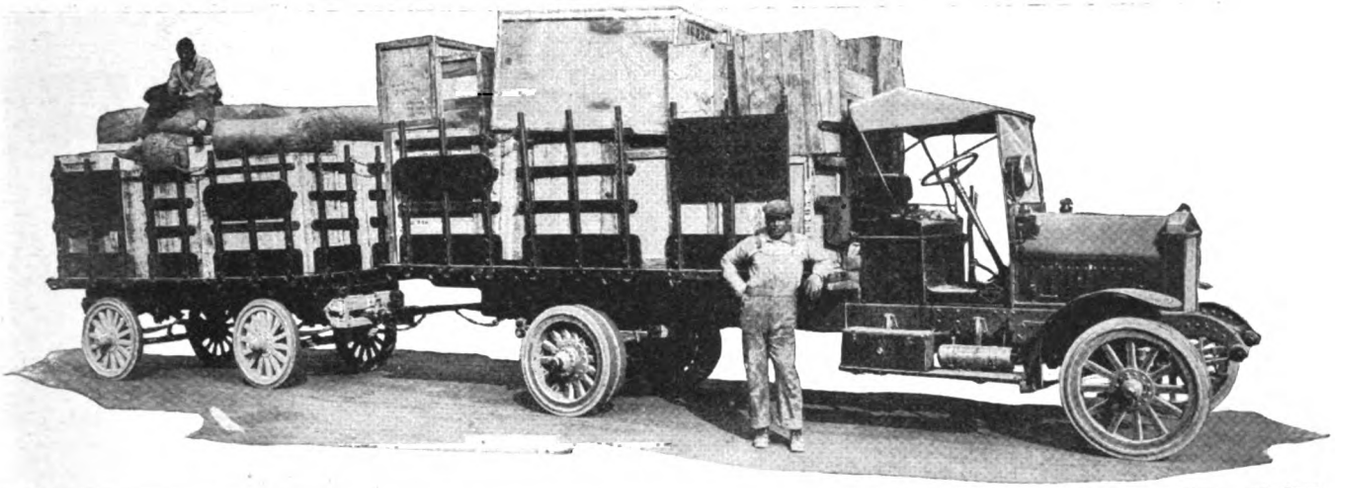

Seven Warner Trailers Save 30% to 35% in Tonnage Cost

This fleet of Warner Four Wheel Trailers is in every-day service hauling loads which average 5,000 to 7,000 pounds on short and long hauls. Warner Trailers *double* the carrying capacity of the trucks which pull them.

Form 1201

WESTERN UNION TELEGRAM

NEWCOMB CARLTON, PRESIDENT GEORGE W. E. ATKINS, FIRST VICE-PRESIDENT

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WARNER MFG CO

BELOIT WISCONSIN

AMONG THE TRUCK TRAILERS IN CONSTANT USE BY THIS COMPANY ARE SEVEN WARNERS WITH BODY LENGTH FROM TEN TO TWENTY FEET THESE CARRY FIVE THOUSAND TO SEVEN THOUSAND POUNDS EACH THUS DOUBLING THE CARRYING CAPACITY OF OUR MOTOR EQUIPMENT AND EFFECTING A SAVING OF THIRTY TO THIRTY FIVE PERCENT IN TONNAGE COST WE USE THEM ON SHORT HAULS AND ALSO ON LONG INTERURBAN AND COUNTRY TRIPS WHERE THEY PROVE ESPECIALLY EFFECTIVE AND SATISFACTORY. THEIR CONSTRUCTION ELIMINATING THE WHIP WHICH FORMERLY CONSTITUTED A SERIOUS OBJECTION TO THE USE OF TRAILERS WITH MOTOR TRUCKS

MERCHANTS TRANSFER CO

Frequently WARNER TRAILERS cut hauling costs in half. Whether the loads are heavy or the hauls are long, the same consistent ton-mile saving is shown. Consider the experience of the Merchants Transfer Company as a guide to what you can save. Each WARNER TRAILER will double the work of your trucks.

No matter what line of business you are in, find out more about WARNER HEAVY DUTY TRUCK TRAILERS. There is a size and type for every hauling proposition from the Two Wheel Warner used in the oil and lumber fields to the Semi-Trailer with Patented Warner Ball and Socket Fifth Wheel and the Reliable Heavy Duty Four Wheel types.

Warner Trailers will be exhibited at the National Automobile Shows—New York and Chicago.

WARNER MFG. COMPANY
26 Main Street Beloit, Wis.

WARNER

HEAVY DUTY TRUCK TRAILERS

TWO AND FOUR WHEEL TYPES

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Mechanical Engineer with 25 years' experience

Mechanical Engineer with 25 years' experience, who has specialized in the practical design and construction of Motor Trucks and Omnibuses for 15 years with the leading manufacturers here and abroad is desirous of forming a connection with a first class organization in which his unique knowledge could be fully utilized in an executive capacity.

Apply to M. E. 46, care of Offices of The Power Wagon, Chicago.

Please mention "Power Wagon" when writing to advertisers.

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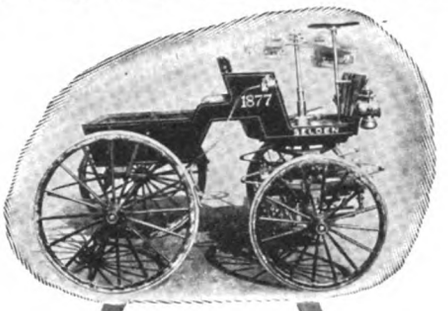
FLEXIBILITY



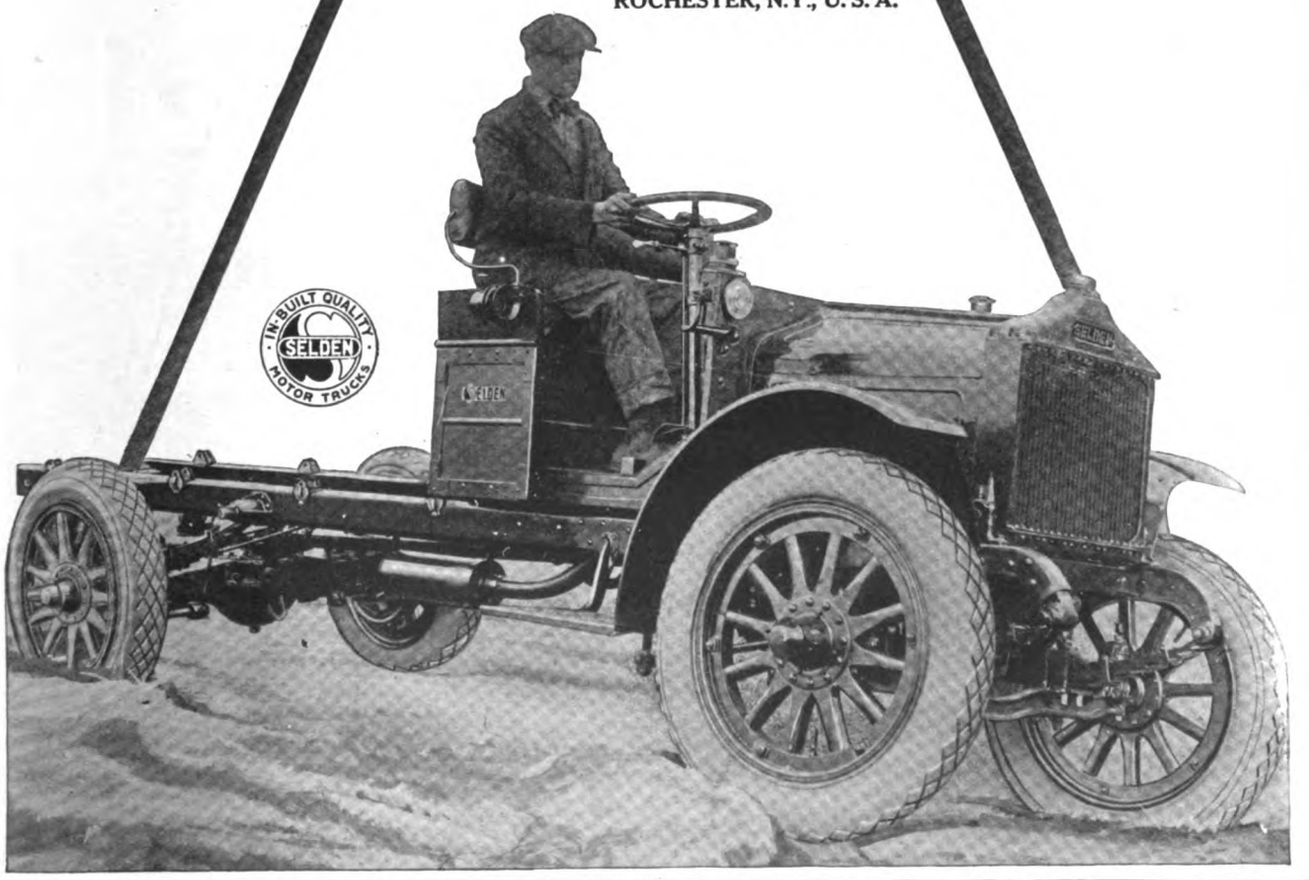
Space J-5
8th Coast Artillery Armory
194th St. & Jerome Ave.
New York City

In your city—your country—your state, haulage demands call for the best in truck construction—for the truck that can do the work. This is the truck you should sell your customers.

Study of the Selden Line at the Show will give you some new ideas as to the proper construction to give long life, proper service. Let us explain the construction.

SELDEN TRUCK CORPN.
ROCHESTER, N.Y., U. S. A.

Space J-5
8th Coast Artillery Armory
194th St. & Jerome Ave.
New York City



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REYNOLDS

MOTOR TRUCKS

Have behind them the strongest and most intelligent plan of co-operation yet devised by a manufacturer, it is the result of our eighteen years exclusive connection with the motor truck industry.

1½—2½—3½ and 5 ton capacities
3 to 4 ton Inter-City Express Specially fitted with pneumatic tires.

Desirable territory is open to responsible distributors

REYNOLDS MOTOR TRUCK COMPANY
MT. CLEMENS, MICHIGAN

Pressed Steel Frames

The largest and best equipped Frame plant in the world

A.O. SMITH CORPORATION
MILWAUKEE

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The National Motor Truck Shows

And Highway Transport Conferences

Under Auspices of National Automobile Chamber of Commerce, Inc.

January 3-10

at NEW YORK

8th Coast Artillery Armory

Take 6th or 9th Avenue L or Lexington Ave. Subway directly to Armory

January 24-31

at CHICAGO

International Amphitheatre

Take South Side L and change at Indiana Avenue for Halsted Street Station

A comprehensive display by all leading manufacturers, filling the largest exposition building in each city. Lectures—discussions—moving pictures—demonstrations of truck uses and economy.

Passenger Car Shows at Grand Central Palace, New York and Coliseum, Chicago on the same dates.

S. A. MILES, Manager **7 East 42nd Street, New York**

Please mention "Power Wagon" when writing to advertisers.

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EVERYDAY
MOTOR TRUCK CAB

Proper protection for the driver is again receiving greater attention with the coming of winter.

Truck buyers realize that an enclosed cab is a necessity, not alone to give the driver better working conditions, but also to insure greater tonnage handled. It means less idle time for the truck, for the driver can drive continuously, whatever the weather.

The Perfect Cab for All Seasons

The EVERYDAY cab is quickly convertible to the needs of the season—completely closed for winter, semi-closed for changeable weather, and open in hot weather.

It is a **Highland** product, conforming to the same high standards of design, adaptability, material, and workmanship as the **Highland** standard bodies.

Specify the **Highland** EVERYDAY cab on all your trucks. It will help sales and increase profits.

The Highland Body Manufacturing Company

1114 Elmwood Place CINCINNATI, OHIO

Detroit Branch: Holden and Greenwood Avenues

3½ Ton Worm Drive Gramm-Bernstein

Ready for the Body; Not an Extra to Buy

Gramm-Bernstein savings begin even before the truck is put to work. They actually begin with the very purchase of the chassis.

For it is sold completely equipped and ready for the body.

There is literally not an extra to buy.

Gramm-Bernstein Trucks carry, as standard equipment, $500 to $550 worth of accessories, according to type and size.

This equipment is all essential to truck operation. Any truck must have it.

Ordinarily, it is paid for, over and above the chassis price.

Nothing of the sort with Gramm-Bernstein. It is complete and ready for the body needed in the work it is to do.

In this, as in the industry itself, and in most of its forward steps, B. A. Gramm has led the way.

Gramm-Bernstein Trucks today have behind them something even greater than almost 20 years of truck building and inventive experience.

They have an honorable record of performance and economy—of high duty and low cost.

They are so firmly intrenched that Gramm-Bernstein owners invariably add a Gramm-Bernstein when they need another truck.

Gramm-Bernstein reliability, willingness to work, and extraordinary long life, are almost proverbial among business men who have experienced them.

Any comparison of work done, on a cost-mile basis of operation and maintenance, will demonstrate the greater economy of Gramm-Bernstein.

Any comparison of truck experience, truck units and truck equipment will demonstrate the greater value of Gramm-Bernstein.

Any Gramm-Bernstein dealer will be glad to advise with you.

All Gramm-Bernstein Transmissions are provided with a pad for attaching Gramm's Basic Patent Power Take-off. Dealers and truck owners should assure themselves that any trucks purchased with power take-off do not infringe B. A. Gramm's Basic Patent No. 1194994

The Gramm-Bernstein Motor Truck Co.

Pioneers Since 1901—Builders of the First Liberty (U. S. A.) Motor

Lima, Ohio, U. S. A.

New York National Truck Show:

January 3 to 10. Section P, Space 6, 7, 8—8th Coast Artillery Armory

Chicago National Truck Show:

January 24 to 31. Section C-4, South Wing—International Ampitheatre

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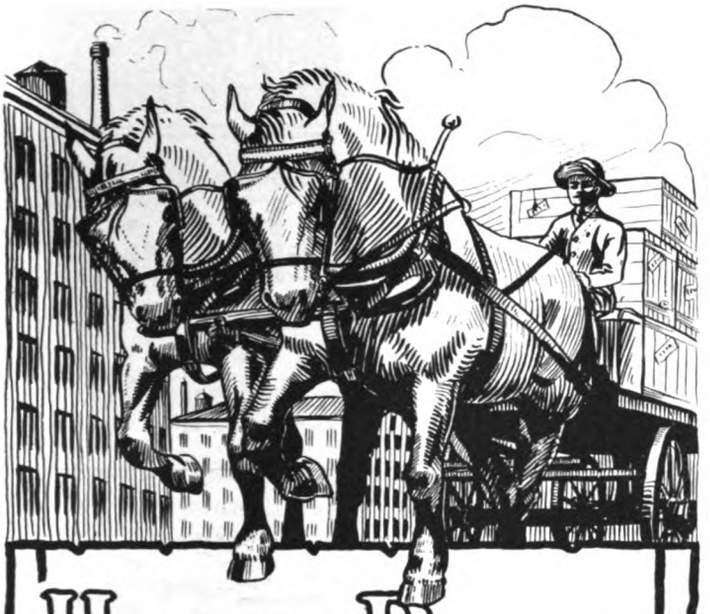

Horse Power

As the horse's vitality depended upon the care and feed given it, so the motor's efficiency depends upon the gasoline and oil fed to it.

Dust and dirt in an oil has a tendency to form a sticky gum which grinds the cylinders as well as causes carbon.

Gasoline that is exposed to the air becomes stale and lifeless. It loses its "pep."

BOWSER STORAGE SYSTEMS

keep the life in gasoline and oil. There is no evaporation of vitality from the gasoline, no dirt getting into the oil.

Write today for Bowser literature which explains. Sent without obligation to you.

S. F. BOWSER & CO., Inc.
Fort Wayne, Indiana,
U. S. A.

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Canadian Office and Factory, Toronto, Ont.

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Havana,
Lonja del Comercio 427
Paris,
5 Rue Denis-Poisson
Sydney,
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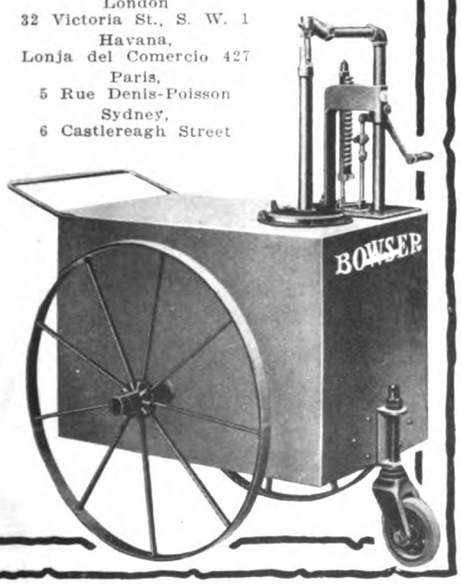
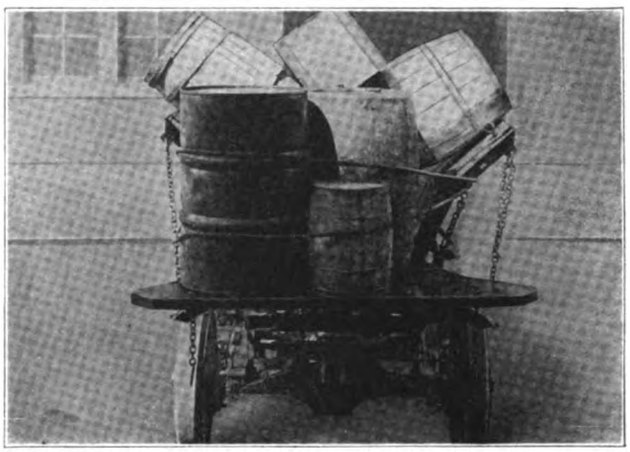


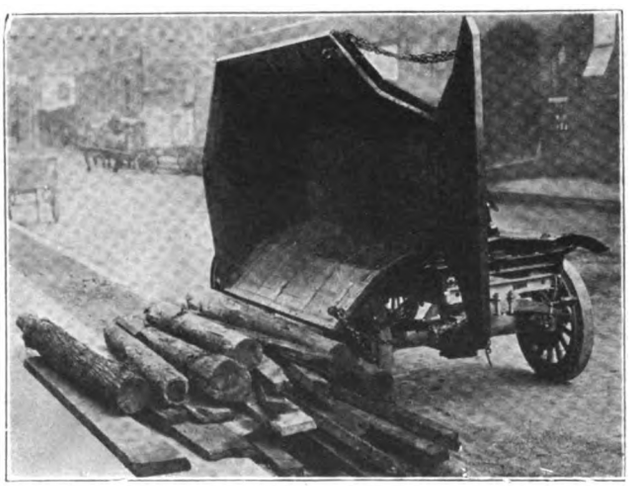
LEE LINE

Trailers—Bodies—Loaders

Express Type Side Dump Body



Most people think of "loose material" as a product of pit, mine or quarry, i. e. gravel, crushed stone, ore, coal, etc. Used in connection with Lee Dump Bodies, the term takes a wider significance and embraces rough lumber, lath, brick, bag cement, grain, loose and in bags, sugar beets, sugar cane, cotton and hundreds of other products hauled by motor trucks.



Conserve the truck's valuable time by dumping instead of unloading by hand whenever possible. Save from twenty minutes to two hours each trip.

Lee "Express Type" Side dump bodies operate the same as the "Standard" Side Dump, but have an end gate useful when non-dumpable merchandise is carried.

If it is a Trailer, Semi-Trailer, Motor Truck or Trailer Body or special handling or hauling equipment—we make it.

LEE LOADER & BODY CO.

Builders of Automotive Auxiliary Equipment

2337 So. La Salle St. Chicago

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CORBIN BROWN

Speedometer

Electrical-proof — weather-proof — water-proof—vibration-proof—wear-proof!

Independent of your truck's starting and lighting system.

Extremes of heat and cold do not affect it.

Rain and water, grit and dirt cannot get under the heavy beveled glass protecting the bold, plain face.

Records mileage, fuel and tire consumption and speed ***accurately*** no matter how low the speed or how rough the going.

No white metal alloy parts—built throughout of service-giving brass and steel.

The ***Maximum Speed Hand***—an extra feature—registers the ***highest*** speed and can be arranged to lock at that registration and hold it until the owner inspects the figures.

Corbin-Brown Speedometer Catalog sent anywhere on request.

Corbin Screw Corporation
American Hardware Corporation, Successor
NW BRITIN, CONN.
Branches: New York Chicago Philadelphia

Truck Manufacturer

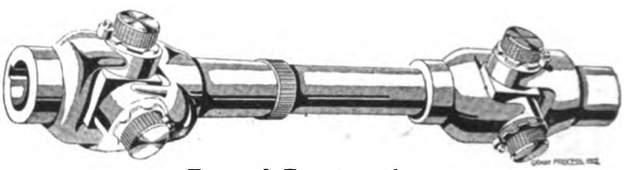
Are you interested in

Prompt Deliveries

of

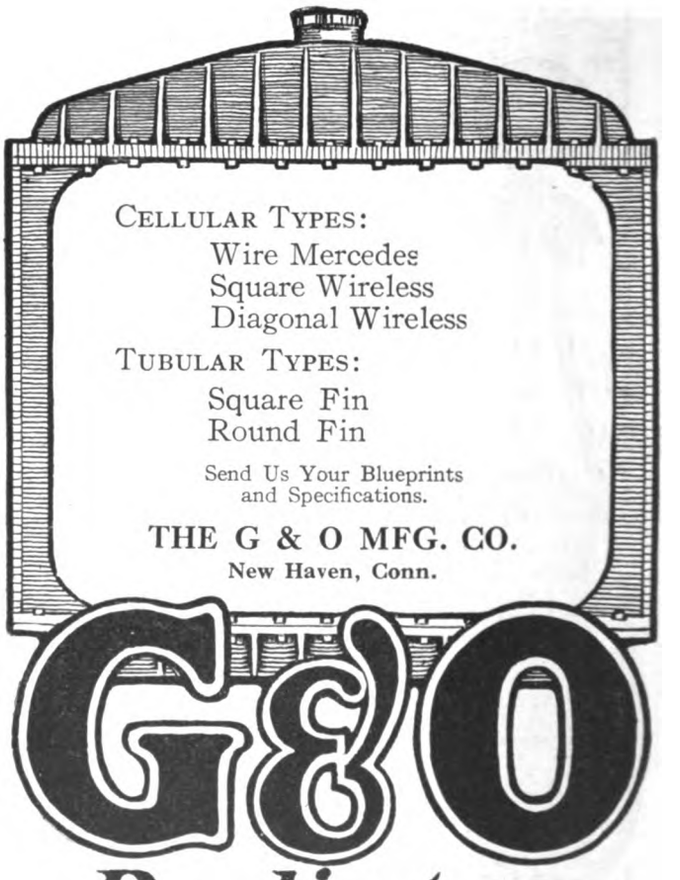
Universal Joints

A standard product made in six sizes to meet all truck requirements



Rugged Construction
Positive Lubrication "Oversize" Bearings

Blood Bros. Machine Co.
Pioneer Makers of Universal Joints
Allegan Michigan



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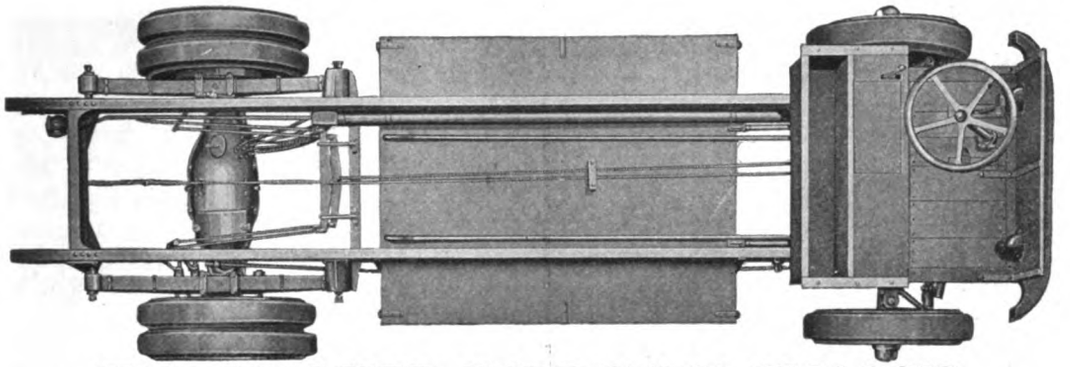
WALKER ELECTRIC TRUCKS



THE WALKER IMPROVED CHASSIS

THE UTMOST IN *SIMPLICITY*—ONE THOUSAND FEWER PARTS THAN ANY GASOLINE CHASSIS
WALKER ELECTRIC CHASSIS ARE OPERATING *PROFITABLY* IN ALL INDUSTRIES.

ASK ANY WALKER USER, BRANCH OR DEALER

WALKER VEHICLE COMPANY

America's Leading Manufacturer of Electric Trucks and Tractors

NEW YORK CHICAGO BOSTON

LOWEST-TRUCKING-COST

NEW DEPARTURE

Full Speed Ahead!

Whether industrial production shall catch up with present demands depends largely upon speeding up machinery, to overcome shortage of men and hours.

New Departure Ball Bearings speed up your machines, reduce power losses; increase accuracy and give machines longer life. Our assistance in the solution of this part of your production problem only waits upon your word.

Our engineering department is at your command. Send us blueprints and data covering maximum and minimum speeds and loads and our experts will send you comprehensive and impartial recommendations.

491

THE NEW DEPARTURE MFG. COMPANY,
Chicago BRISTOL, CONN. Detroit

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WOOD
HYDRAULIC
HOIST & BODY
COMPANY

Manufacturers of

Wood Hydraulic Hoists and Steel Dumping Bodies

CHICAGO DETROIT NEW YORK

"and the Motor's a Wisconsin"

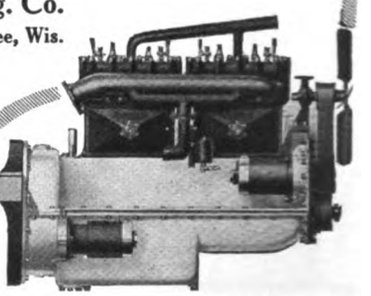
CONSISTENT

—this means that the engine was perfectly fitted, adjusted and run-in *before* it left the Wisconsin shops. Think that over, Mr. Manufacturer, Mr. Dealer and Mr. User. **WISCONSIN** Engines are *priced* higher, but cost less than others—less to install—less to sell—less to use.

Write for description.

Wisconsin Motor Mfg. Co.
Station A, Dept. 313, Milwaukee, Wis.

DISTRIBUTORS:
New York Branch: T. M. Fenner, Factory Representative, 21 Park Row, New York City, N. Y.
California Distributor: Earl P. Cooper Co., Los Angeles, Calif.
Northwest Distributor: Chandler-Dunlap Co., Seattle, Wash.

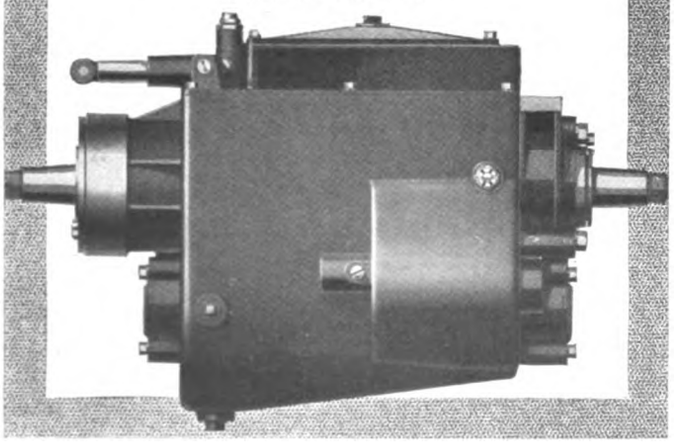


COVERT TRANSMISSIONS

Strength—Durability—Power

The above qualifications account for the demand for Covert transmissions among leading motor truck manufacturers.

Covert Gear Company, Inc.
Sales, Engineering and Service
967 Woodward Ave. Detroit, Mich.
Factory; Lockport, N. Y.



BRUNSWICK TIRES

Each tire that bears the name Brunswick has paid perfection's price. Brunswick Tires could be built more cheaply, but the policy of the House of Brunswick for over three quarters of a century remains unchanged, despite the great and growing demand for its many quality products.

Brunswick Tires are offered with the assurance of unqualified merit. A test will prove what Brunswick Standards mean in fine tire building. Dealers will be repaid by writing for full particulars about Brunswick Tires and Brunswick Service.

The Brunswick-Balke-Collender Co.
General Offices: 623-633 S. Wabash Avenue
CHICAGO

There's a Brunswick Tire for Every Car.

Branches in Principal Cities of the United States and Canada.

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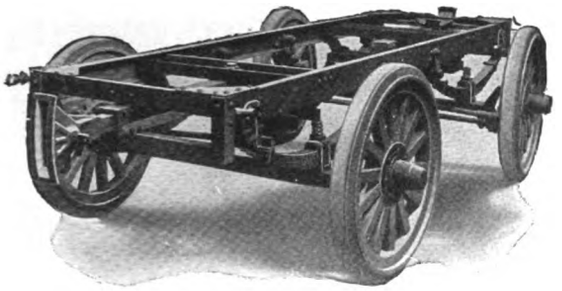


ARCADIA TRAILERS

Four Wheels—2, 2½ and 5 tons
Semi-Trailers—2, 4 and 6 tons
Log and Pole Trailers—2, 4 and 6 tons

There are many transportation problems that cannot be profitably figured without Trailers being used. Our engineers are ready to help you if you will give us the chance.

DEALERS—Some good territory is ready for you. We have a "Trailer for Every Trade" built under one roof. Write for information.

Arcadia Trailer Corporation
23 Murray Street
Newark, New York State
Sole Foreign Sales Representative, Automotive Products Corp., Woolworth Bldg., New York.

Let us Prove to You that

OSHKOSH

4-wheel-drive-truck

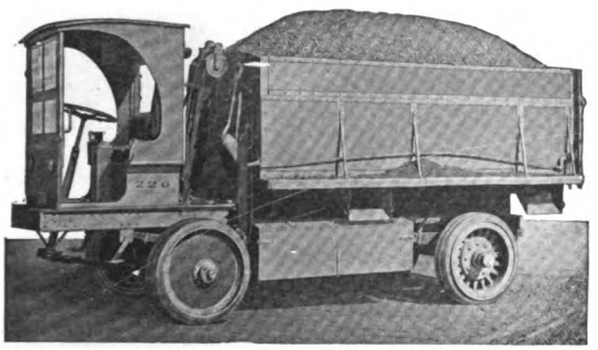
hauls a capacity load at greater speed on less gas, than other two ton trucks.

The Oshkosh 4-Wheel Drive attains practically 100% transmission of motor power to the four wheels, all of which are driving wheels—front ones pulling and rear ones pushing.

In this truck there is virtually no power loss due to road slippage, whereas with the two-wheel drive the average loss, even on good roads, is 20%.

A few profitable territories are open. Write immediately for information.

Oshkosh Motor Truck Mfg. Co.
Oshkosh, Wisconsin



Front or Four-Wheel Drive Trucks and Tractors

Conservation is the key to success. ***Couple-Gear*** is the method, saves men and horses. Derives its propelling force from water flowage. The ***best*** is the ***cheapest.***

Your inquiries are solicited

Couple-Gear Freight-Wheel Co.
1550 Buchanan Ave., GRAND RAPIDS, MICH.

Couple-Gear Power Truck Co.
Peoples Gas Building, Chicago, Ill.

Couple-Gear Electric Truck Co.
179 W. First St., S. Boston, Mass.

WISCONSIN
CUSTOM BUILT
AXLES

The strength and consistent performance of Wisconsin Worm-Drive Axles are due to the simplicity of their design.

Wisconsin Axles are specified as standard equipment by many of America s largest truck manufacturers. Be sure your next truck is Wisconsin equipped.

Wisconsin Parts Co.
OSHKOSH WISCONSIN

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MUTUAL

"America's Greatest" TRUCK

2-3½ and 5-ton with solid tires.
2½-4 and 6-ton with pneumatic tires.

See it at the Chicago Show

The more you know about trucks the more eager you will be to be the "Mutual" representative in your territory.

Send for our "Dealership" Folder

Mutual Truck Company
Sullivan - - - Indiana
U. S. A.

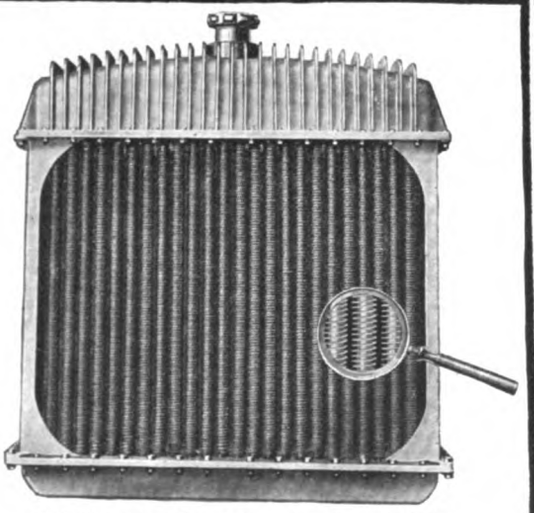
SAVAGE

REAR AXLE

SAVAGE QUALITY TRADE MARK

SAVAGE ARMS CORPORATION
SELKIRK, N.Y.
UTICA NEW YORK DETROIT PHILADELPHIA

RADIATOR INSURANCE

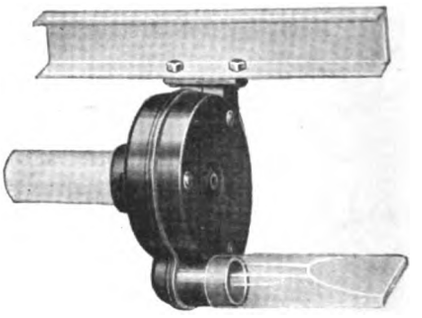


GUARANTEED FOR THE LIFE OF THE TRUCK

These Seamless Helical Tube Cooling Sections are perpetual insurance against radiator trouble.

Write for complete information

Rome-Turney Radiator Co.
Rome, New York, U. S. A.



THE VACUUM MUFFLER

An entirely new development in muffler design, overcoming in a scientific and practical way the biggest faults of the old style mufflers. Offers practically no back-pressure and guaranteed BLOW-OUT PROOF.

Approved as standard equipment by over eighty truck and tractor manufacturers.

THE VACUUM MUFFLER CORP'N OF AMERICA
Tribune Bldg. New York

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CLASSIFIED WANTS

HELP WANTED	SITUATIONS WANTED	FOR SALE	FOR RENT	MISCELLANEOUS
Executives	Executives	Used Motor Trucks	Motor Trucks	Contract Work
Salesmen	Salesmen	Parts	Trailers	Repairs
Dealers	Agencies	Accessories	Tractors	Patents
Agencies	Foremen	Tires	Factories	Engineers
Foremen	Mechanics	Agencies	Garages	Schools
Mechanics	Miscellaneous	Businesses, etc.	Equipment	Machine Shops

JANUARY, 1920

HELP WANTED

Executives

Advertising Manager

Manufacturer of motor truck bodies and hoists requires services of active young advertising manager. Must be fully conversant with mechanical details, know something about printing and possess a knowledge of mediums. Moderate salary until ability demonstrated. Located in Central West. Address Box 3, Power Wagon.

Salesmen

SALESMEN

Must be experienced, calling on the Automotive Trade.

Not over 35—single preferred.

Must be willing to travel anywhere.

Must be able to sell a publication of highest merit to Motor Truck and Passenger Car Dealers, jobbers and large users of trucks.

Must be able to furnish references attesting good character and integrity.

Excellent opportunity for advancement—good salary and expenses to start, and frequent increases as results justify.

Tell us fully about yourself, the salary you would expect, your age and your experience.

Address Box H242, Power Wagon.

SITUATIONS WANTED

Executive

SALES MANAGER

Long and wide experience in motor truck industry. Have built a large organization during past four years and established distributing points in nearly all large cities throughout country. Desire to make change March 1st. Full experience and any other information desired by mail. Confidential address Box 76, Power Wagon.

HELP WANTED

Salesmen

A High Class Truck Salesman

One who is experienced and is seeking to locate with an established business. The Bunker Auto Co., 249 W. Douglas, Wichita, Kansas.

Wanted—Truck Salesman

to sell one of the oldest and most complete lines of trucks on the market. Only first-class salesman that can produce results need apply. In replying give experience and references. Box 18, Power Wagon.

HELP WANTED

Executive

Sales Manager

Carburetor manufacturer has just completed large factory and wants a Sales Manager competent to handle national sales campaign. Must be high class man whose ability and experience fits him for the place. Give full details in first letter. Address Box No. 76, care Power Wagon.

CONTRACT WORK

METAL STAMPINGS

Tools, Dies, Jigs, Fixtures, Lathe and Planer Work

Send us your inquiries

Great Lakes Pressed Steel Corp.

1401-1411 Niagara St., Buffalo, N. Y.

USED MOTOR TRUCKS FOR SALE

USED TRUCKS

1-Ton Garford, express body, canopy top, windshield, used as service truck, good running condition, tires O. K.

1½-Ton Garford, express body, cab and windshield, thoroughly overhauled. Front tires new, rear tires O. K.

5-Ton Garford, dump body, hydraulic hoist, thoroughly overhauled, tires O. K.

6-Ton Garford, dump body, hydraulic hoist, good running condition, tires O. K.

We also have some used trucks of other makes, and will send you our used truck list on request.

Garford Motor Truck Company, Inc.

Calumet 3060 23rd and Indiana Avenue

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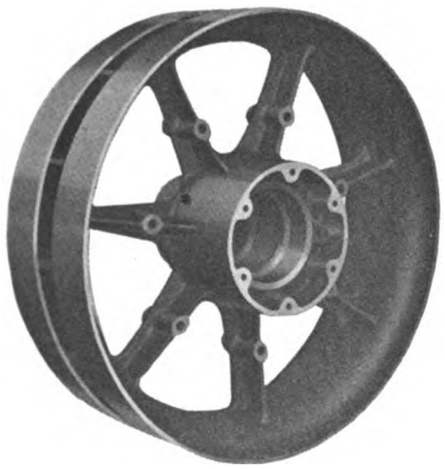
WEST
Cast Steel Wheels



Hubs Cast Integral
Any Make of Axle
Any Make of Tire

Specify West Cast Steel Wheels On Your Next Truck Order

THE WEST STEEL CASTING CO.
Cleveland, Ohio

New York	Chicago	Detroit
1790 Broadway		205 Kresge Bldg.

"Watch the WEST STEEL WHEELS Go 'Round"

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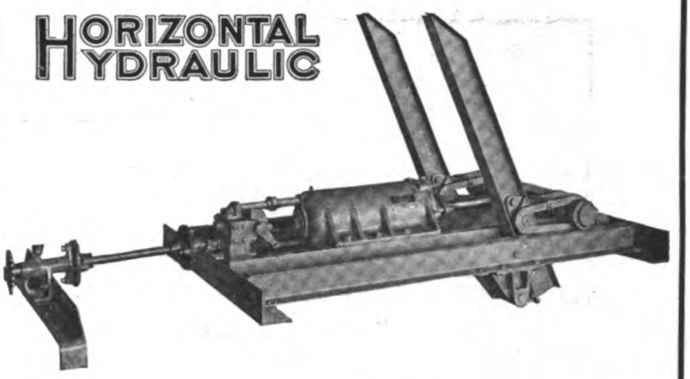
HORIZONTAL HYDRAULIC



Increases Efficiency of "All-Purpose" Bodies

Efficiency is comparative. It is reckoned in terms of percentage.

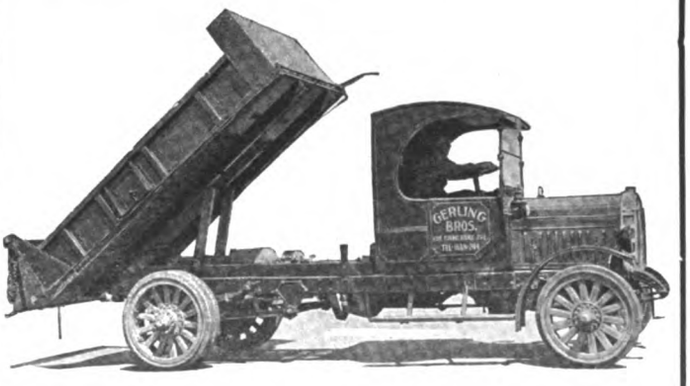
The "All-Purpose" body is efficient because it adapts the truck for hauling all classes of materials.

The Horizontal Hydraulic Hoist increases the percentage of efficiency, because:

1. It delivers a high dumping angle—unloads the truck quickly.
2. It increases the number of actual trucking hours.
3. It is uncomplicated and trouble-free.

Truck buyers are always looking for the motor truck of greatest efficiency. They cannot overlook the truck equipped with Horizontal Hydraulic Dumping Units.

Write today for our special folder containing prices and specifications on "All Purpose" Bodies and Horizontal Hydraulic Hoists.



Horizontal Hydraulic Hoist Co.

General Sales Office:
456 Book Building, Detroit, Mich.

Factory: 31 to 37 Twenty-Fifth St., Milwaukee, Wis.

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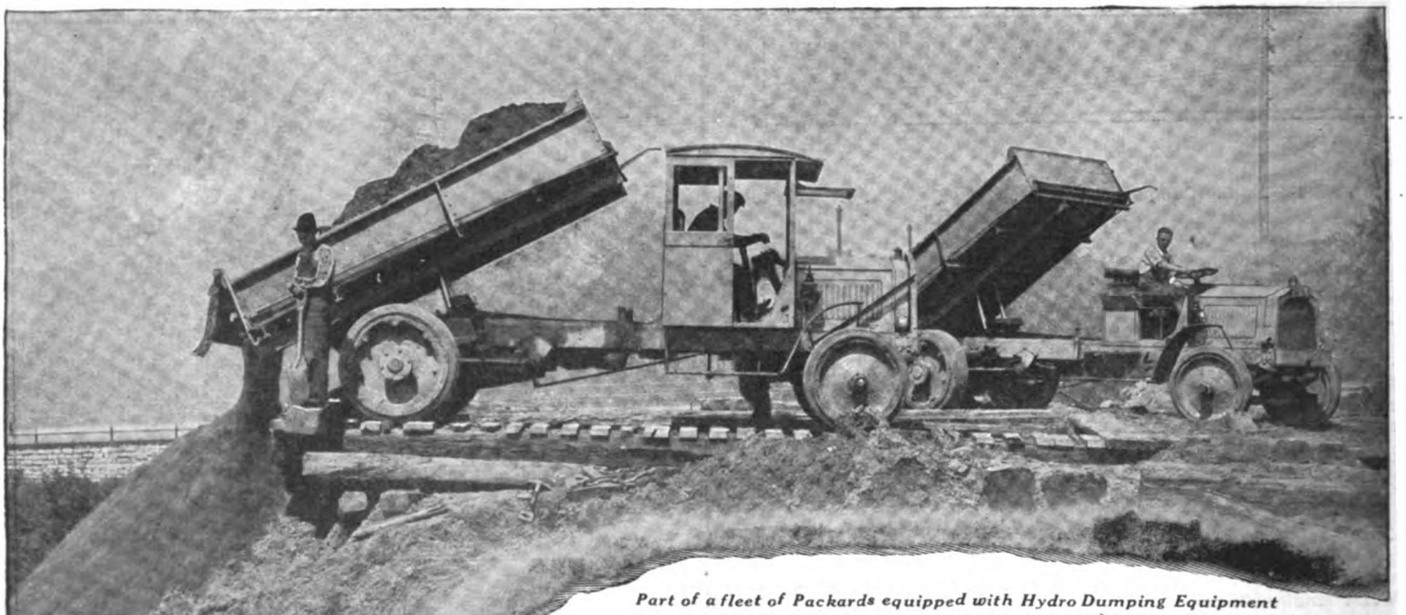

Part of a fleet of Packards equipped with Hydro Dumping Equipment

A STUDY IN POWER

Power properly applied is one of the distinctive features of the Hydro Dumping Equipment "Made by Heil." THE HYDRO HOIST has power, ample power, applied where the chassis is best able to have it applied—near the rear axle and between the rear spring shackles. There are no broken chassis frames with a Hydro Hoist.

Every Hydro Hoist that goes out of the factory is tested to twice the hydraulic pressure that is required to lift its load.

A No. 5 Hoist for a 5-ton truck has a tested, lifting force or power of over 13 tons which is not nearly its maximum strength.

Moreover, the power is delivered in a steady, even, direct lift at all times—the hoist adjusting itself to the body as it raises.

Finally, with a Hydro Hoist you have a minimum of weight and of complex mechanism. You do away with all pipes, pulleys, cables, rollers, arms and their attendant troubles when you specify or recommend The Hydro Hoist.

Send for Circular 107

THE HEIL CO.

1140 Montana Ave. Milwaukee, Wis.

BRANCHES: 20 E. Jackson Blvd., Chicago, Ill.
Greenwood & Holden Aves., Detroit, Mich.
Wentworth & St. Anthony Aves., St. Paul, Minn.

Quality Bodies

"Made by Heil"

are the recognized standard of the Motor Truck Industry. An ever-increasing number of Motor Truck Manufacturers proclaim this fact.

Heil will exhibit at the New York and Chicago shows.

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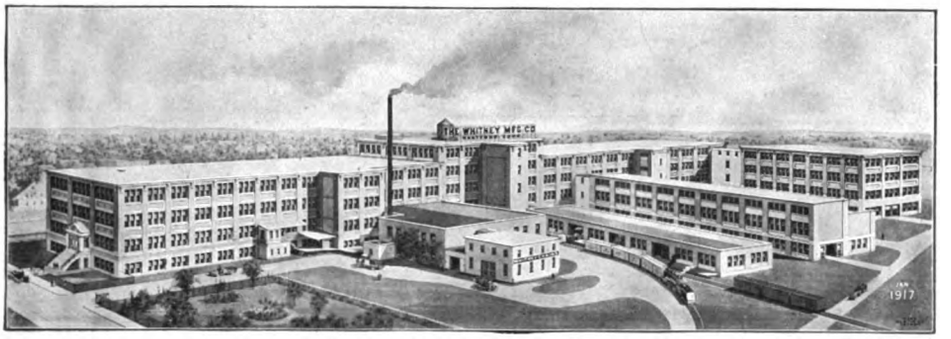
Roller Type



"WHITNEY" CHAINS

Equip Your Motor Trucks and Tractors with "Whitney" Chains

Now that the motor truck is handling so much of the freight that was formerly cared for by the railroads, it must run on a schedule almost as exacting as that of the railroad train itself. This emphasizes the necessity of selecting a chain which can be relied on under all conditions of speed, road and weather.

THE WHITNEY MFG. CO.

HARTFORD, CONN.

Chains **Keys and Cutters** **Hand Milling Machines**

Silent Type

"The Spring is the Thing"

MATHER SPRINGS

Scientifically Heat-Treated

Unequalled For

Lightness, Flexibility and Endurance

Genuine made only by

THE MATHER SPRING COMPANY

Toledo, Ohio.

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Stewart
MOTOR TRUCKS

World leadership in only seven years

ONLY seven years old, and one of the international leaders in truck building! Last year the world paid over $9,000,000 for Stewart trucks and wanted more. This year in a vast new plant, Stewart production will exceed $16,000,000.

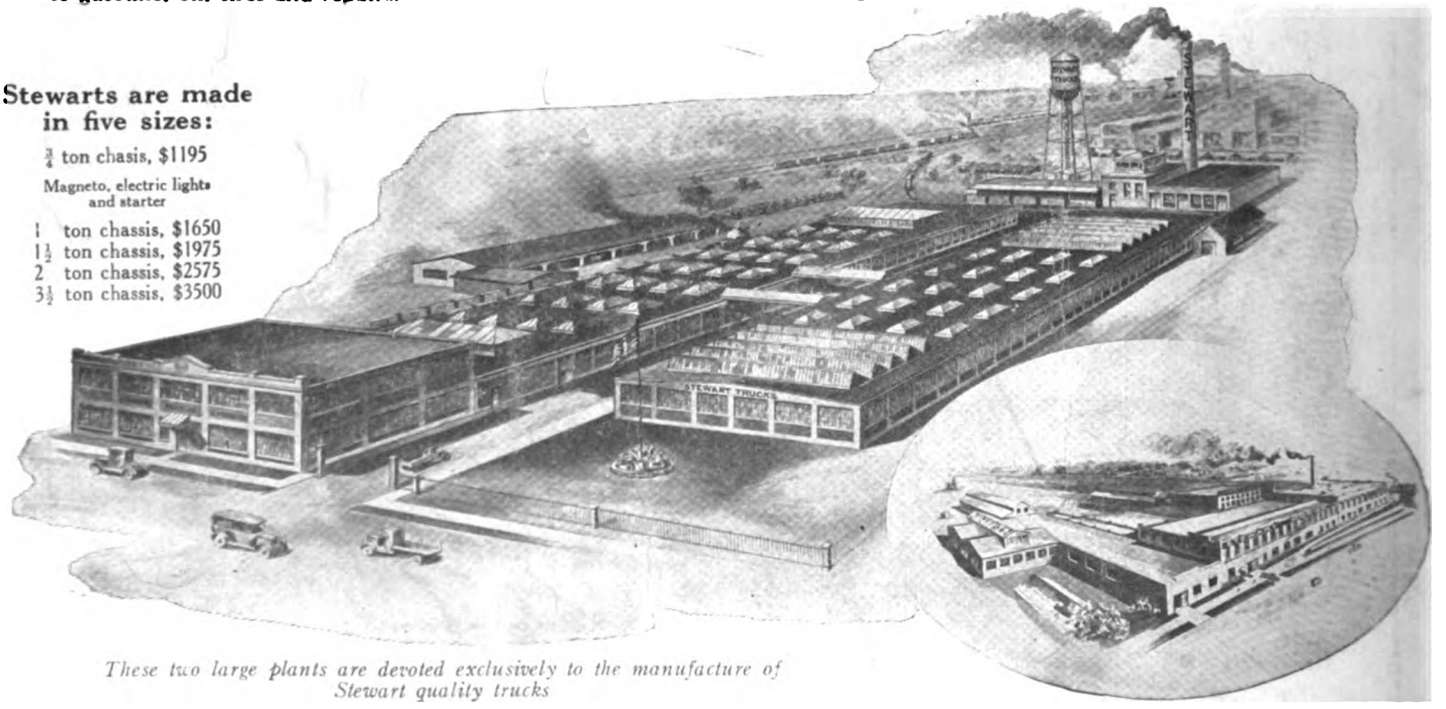
This astounding growth was inevitable. For Stewart design eliminates hundreds of really needless parts, not only saving $200 to $300 in first cost, but producing a stronger truck, simpler to operate and more economical as to gasoline, oil, tires and repairs.

Stewart owners are not merely pleased. They are enthusiastic. Hundreds of firms that began with one truck are now operating large fleets of Stewarts. The Stewart reputation for money-saving service has circled the globe. Thousands of Stewarts are paying daily profits in over 600 American cities, on hundreds of farms and in 27 foreign lands.

Stewart exhibits at all important motor shows give a real opportunity to convince yourself that the Stewart is America's greatest truck value.

Stewarts are made in five sizes:

¾ ton chasis, $1195
Magneto, electric lights and starter
1 ton chassis, $1650
1½ ton chassis, $1975
2 ton chassis, $2575
3½ ton chassis, $3500



These two large plants are devoted exclusively to the manufacture of Stewart quality trucks

STEWART MOTOR CORPORATION, BUFFALO, N. Y.

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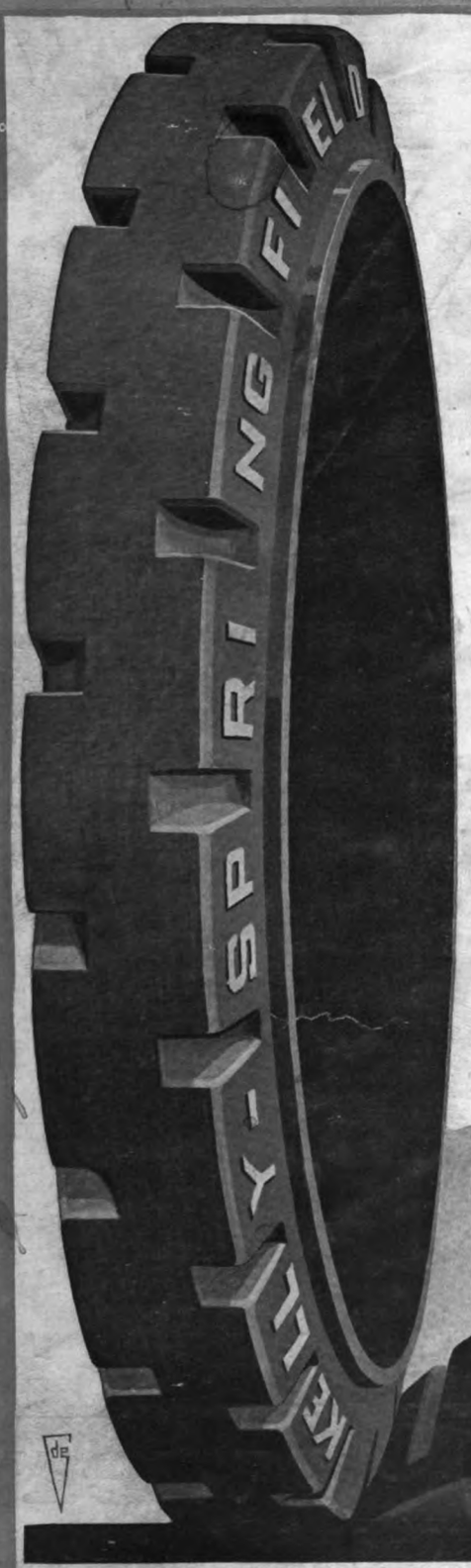
POWER WAGON

Number 183 CHICAGO, FEBRUARY, 1920 Price 15 Cents



How fast does a truck wear out?

If a truck were jacked up off the ground and the engine used merely to transmit power to some machine, it would take years to wear out the motor.

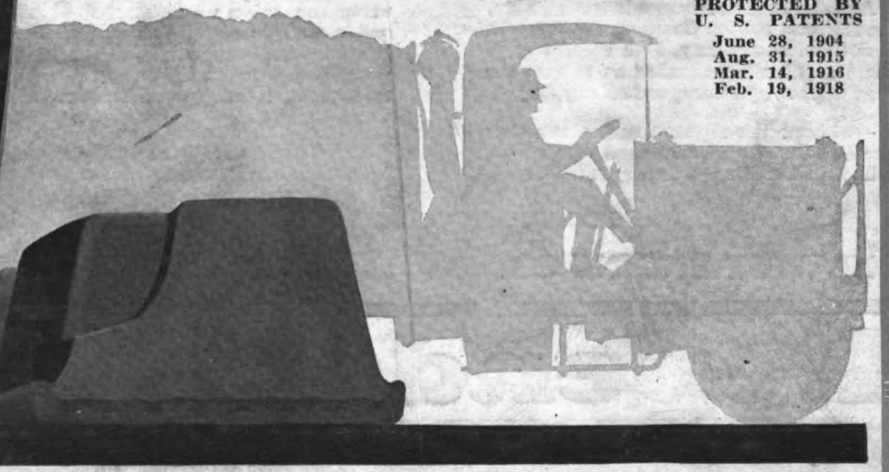
It isn't the running of a truck engine that wears it out. It's the pounding it gets from road shocks.

The life of a truck is very largly dependent upon the resiliency of the tires it rides on.

Fleet-owners who have put Kelly Caterpillars on their trucks tell us that the trucks now spend their time on the road instead of in the repair shop.

The reason is simply that Kelly Caterpillars have an unusual depth of rubber and a system of side vents that doubles their resiliency.

Kelly-Springfield Tire Co.
GENERAL SALES DEPARTMENT
4614 Prospect Ave. Cleveland, O.



PROTECTED BY U. S. PATENTS
June 28, 1904
Aug. 31, 1915
Mar. 14, 1916
Feb. 19, 1918

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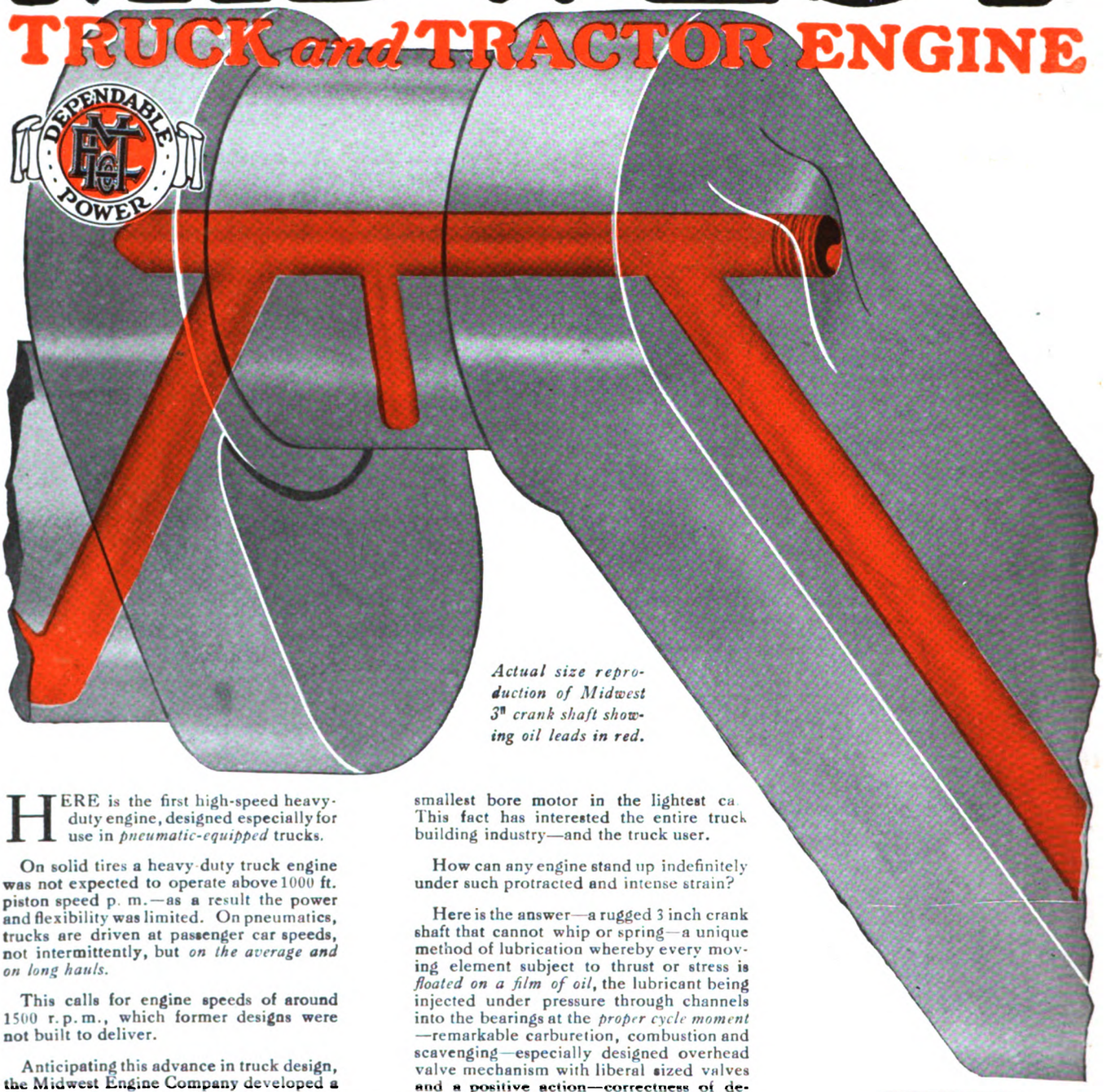
MIDWEST

TRUCK and TRACTOR ENGINE



Actual size reproduction of Midwest 3" crank shaft showing oil leads in red.

HERE is the first high-speed heavy-duty engine, designed especially for use in *pneumatic-equipped* trucks.

On solid tires a heavy-duty truck engine was not expected to operate above 1000 ft. piston speed p. m.—as a result the power and flexibility was limited. On pneumatics, trucks are driven at passenger car speeds, not intermittently, but *on the average and on long hauls.*

This calls for engine speeds of around 1500 r.p.m., which former designs were not built to deliver.

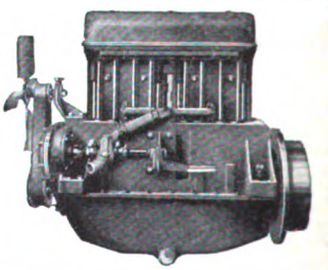
Anticipating this advance in truck design, the Midwest Engine Company developed a new type, heavy-duty, high speed engine capable of hurling a loaded truck over the road at passenger car speed *all day long*

—without the slightest undue strain or stress on the power plant—and with a flexibility in handling equalling that of the smallest bore motor in the lightest ca. This fact has interested the entire truck building industry—and the truck user.

How can any engine stand up indefinitely under such protracted and intense strain?

Here is the answer—a rugged 3 inch crank shaft that cannot whip or spring—a unique method of lubrication whereby every moving element subject to thrust or stress is *floated on a film of oil*, the lubricant being injected under pressure through channels into the bearings at the *proper cycle moment* —remarkable carburetion, combustion and scavenging—especially designed overhead valve mechanism with liberal sized valves and a positive action—correctness of design, fineness of workmanship—large dimensions and abnormal margins of strength throughout, insuring against breakage and wear.

The Midwest Engine actually *does* meet pneumatic requirements.



ADDRESS SALES DIVISION 16.

MIDWEST ENGINE CO. **INDIANAPOLIS, IND.**

Dependable Power

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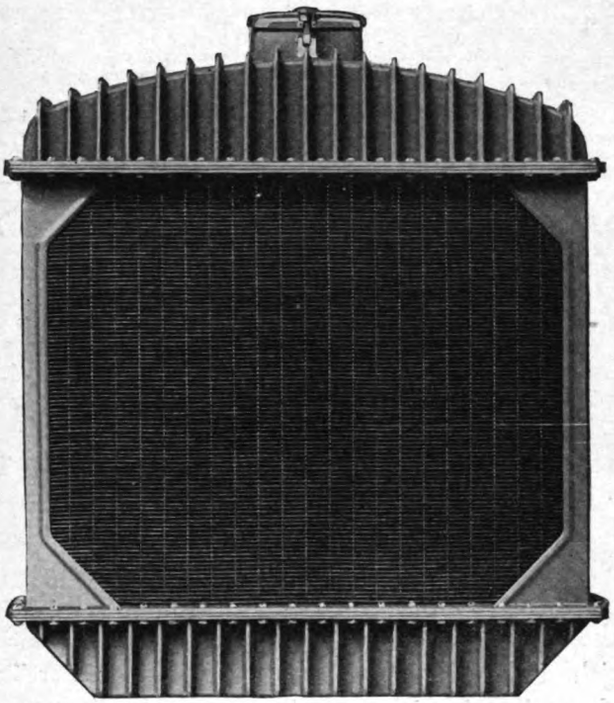

Long Cooling Systems Designed and Constructed for Each Particular "Job" are Used on More Leading Motor Trucks Than Any Other Cooling Unit

THE reason for its universal satisfaction and preference is very apparent—18 years of building the most efficient system of automotive radiation have *taught* something, this "something" —*everything*—is placed gratuitously at the disposal of automotive producers that they may avail themselves of the trained, experienced and *specialized Services* of our engineers to assist in pre-determining the needs of the motor for every service. *Success invariably follows as a natural consequence.*

No engine can be more efficient than its cooling system.

Maximum motor efficiency (so far as affected by radiation) is attained by the adoption of The Long Cooling System.

LONG MANUFACTURING CO., DETROIT, MICHIGAN

Pioneer Makers of Cooling Systems for Gasoline Engines

LONG
COOLING SYSTEMS

The Recognized Standard for Tractor, Trucks and Motor Cars.

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"NORMA"
PRECISION
BALL BEARINGS
(PATENTED)

THE "factor of safety" of a car, truck, tractor or power boat is no higher than the factor of safety of the weakest part entering into its construction. Which indicates the necessity for a fine balance of quality throughout, and emphasizes the fact that there is no "minor part" in an automotive unit.

It is not alone mechanical friction which "NORMA" Bearings minimize in most high-grade magnetos and lighting generations. Their trouble-free performance also minimizes friction between car owner and car dealer—and between car builder and apparatus maker.

See that your electrical apparatus is "NORMA" equipped.

THE NORMA COMPANY
OF AMERICA
Anable Avenue
Long Island City
New York

Ball, Roller, Thrust and Combination Bearings

POWER WAGON

An exponent of the most enlightened thought and practice of the motor truck industry.

Published monthly by
THE POWER WAGON PUBLISHING COMPANY
544 Lake Shore Drive, Chicago

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ROSS STEERING GEARS

Contented Drivers Mean Greater Efficiency from Man and Motor Truck

About 85 per cent. of the actual operation cost of a motor truck is represented by the salary of the man who drives it. This is a fact which must be considered both by the manufacturer or dealer who sells the truck and by the man who buys it.

All the time that the truck is running, the steering gear must be operated by the hands and the arms of the driver. Easy steering conserves human strength, makes a more contented driver, and means a bigger day's work more easily done.

Because their enormous bearing surfaces guarantee easy steering, safety and reliability, and thus increase efficiency, 165 motor truck manufacturers are now using Ross Steering Gears as standard equipment.

Write for further information

ROSS GEAR & TOOL COMPANY
780 HEATH STREET, LAFAYETTE, INDIANA, U. S. A.

The Steering Gears that Predominate on Motor Trucks

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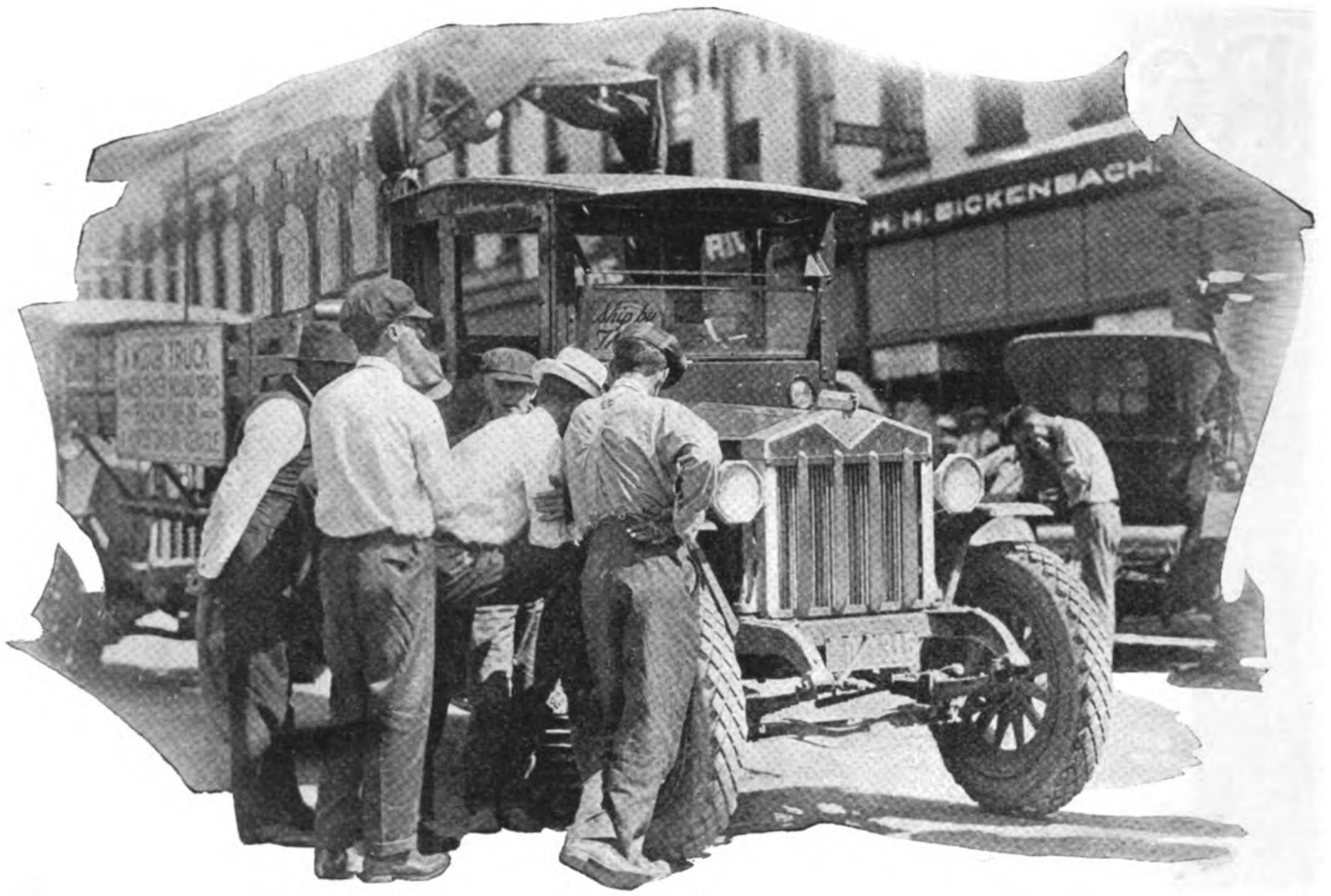

They Are Interested in Clydesdale

This is an illustration of the immense amount of interest displayed in Clydesdale's exclusive feature, "The Driver Under the Hood."

The truck shown is the one which went on the National Truck Development Tour, and the men are prospective truck purchasers in one of the towns at which the truck train stopped. These men had heard of the "Driver Under the Hood" and were so engrossed in an examination of it that they failed to see the camera man.

This intense interest which is always shown in "The Driver Under the Hood" is one of the secrets of the success of Clydesdale dealers. And back of this are engineering principles and manufacturing practices which have made the Clydesdale a leader among motor trucks for more than eight years.

Increased production facilities will enable us to offer the Clydesdale franchise to a few more dealers who have facilities for handling a "world proven" motor truck.

No Other Truck Has It
"The Driver Under the Hood"

One to Five Tons Net Load

THE CLYDESDALE MOTOR TRUCK COMPANY, CLYDE, OHIO

CLYDESDALE

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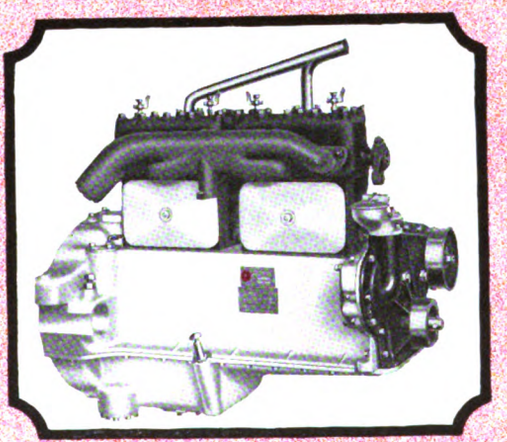
If you want uninterrupted service let your next car or truck be equipped with a Red Seal Continental Motor. A quality product.



Continental Motors Corporation
OFFICES: DETROIT, MICHIGAN
FACTORIES: DETROIT; MUSKEGON

Continental Motors

CONTINENTAL MOTORS — Powerful as the Nation — AMERICA'S STANDARD

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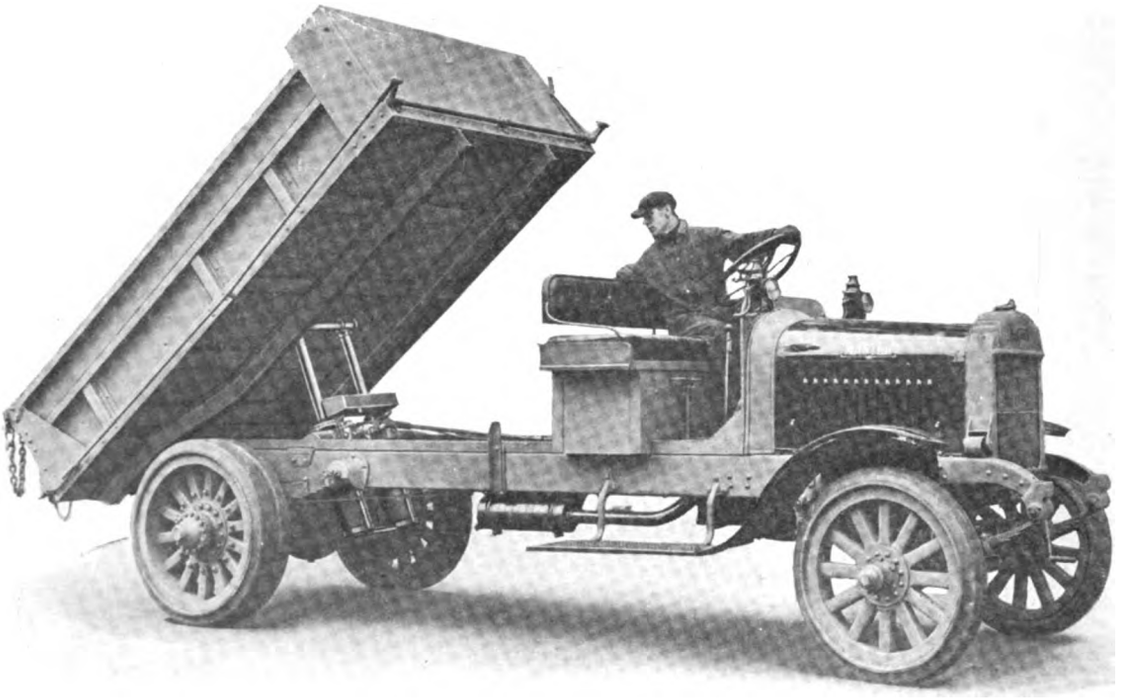
"MADE BY HEIL."



MAKE AN ADDED PROFIT

Sell your chassis complete, fitted with Hydro Dumping Equipment or Compartment Truck Tanks.

When you sell equipment "Made by Heil" it is with the full assurance that your customer has secured the best obtainable and you have the further assurance that the equipment will help the truck maintain its good name. Heil "Quality" means Quality. It also means service.

The 4 in 1 Combination Body shown is adapted to give the widest possible range of service. Fitted with two sets of removable sides it has coal capacity; one set of sides gives gravel capacity; without sides it is a platform body fitted with stake pockets for general haulage.

When furnished with the Hydro Hoist it makes an absolutely satisfactory dump job. Notice the direct action of the hoist. There are no pulleys, cables, pipes, or arms to get out of order. It is just another of the distinctive features of the Hydro Hoist.

Circular 109 tells how to make the added profit—Write for it today—

Quality TANKS BODIES & HOISTS "Made by Heil"

THE HEIL CO.

1140 Montana Avenue
Milwaukee, Wis.

Please mention "Power Wagon" when writing to advertisers

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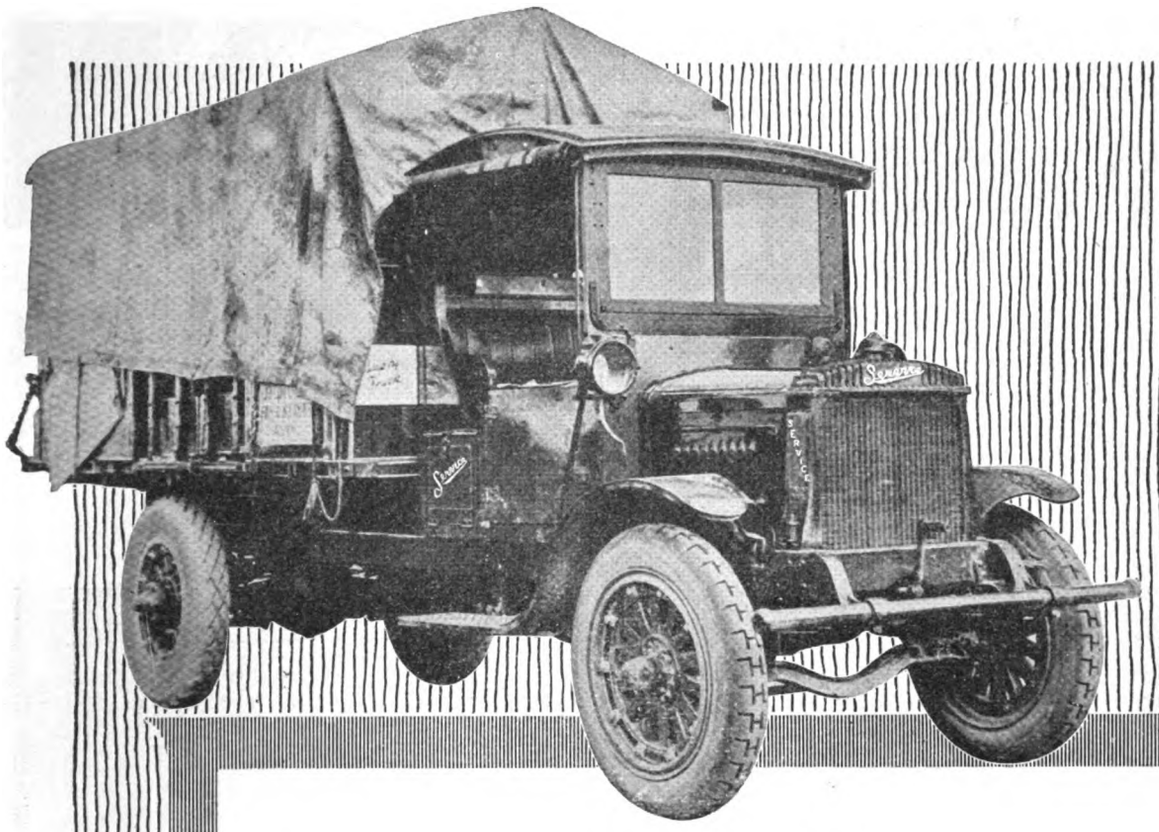

Increasing Demand

for carriers of a better type has caused SERVICE Motor Trucks to experience a steady growth in sales. That such a gain was the result of proven performance, is shown by the fact that for the past four years 68% of SERVICE sales were repeat orders.

SERVICE distributors are backed by a company of proven reputation and financial standing—a company whose watchword is co-operation and who believes in sales creating publicity. The Lazal Motor Corporation, SERVICE Distributor for New York, wrote as follows to a prospective dealer:

> *"It is self-evident that we could not have attained the success we undoubtedly have, unless the truck itself had merit, and unless we had received most generous co-operation from the factory.*
>
> *"As to the merit of the SERVICE Truck, the following statement of fact will probably be sufficient to convince you: With two exceptions, every purchaser of a SERVICE Truck since 1916 has purchased another SERVICE Truck if he were in the market for a second truck at all."*

SERVICE Motor Trucks—Seven Models, from 1 to 5 tons—offer a most profitable line for the dealer. Write for complete details, stating the territory you desire.

Service Motor Truck Co., Wabash, Ind., U. S. A.

NEW YORK—87-89 West End Ave. CHICAGO—2617-25 So. Wabash Ave.

Service

MOTOR TRUCKS

Builders of Business

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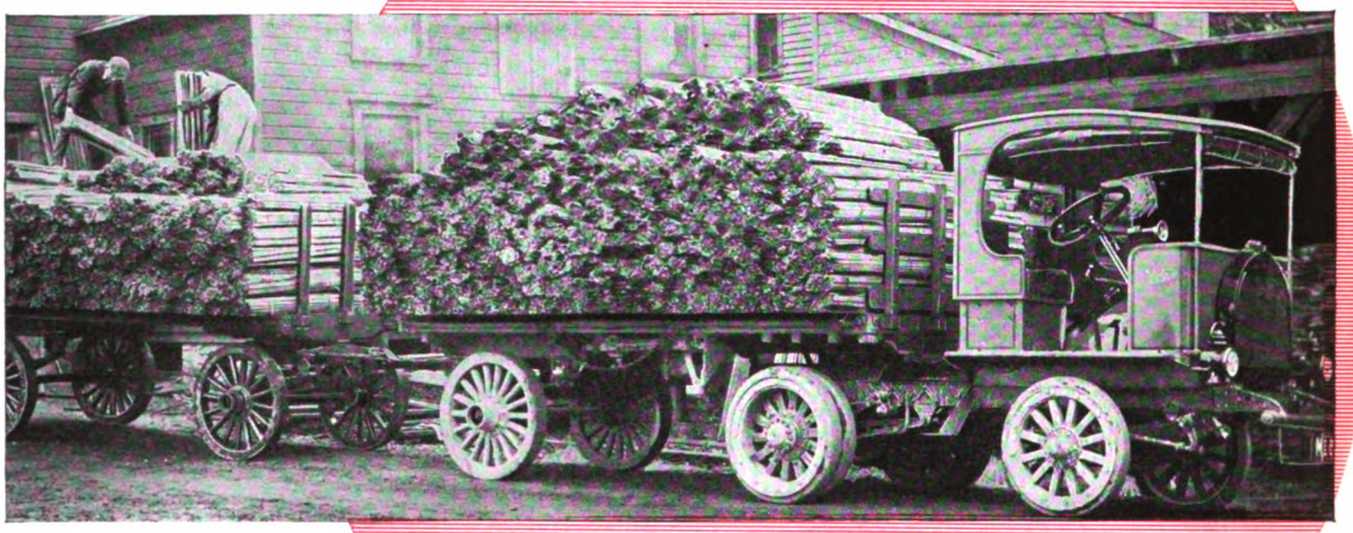
WATSON Haulage



A Complete Line of Haulage Equipment

IT IS a distinct advantage for the User and the Dealer to do business with a House big enough to manufacture a complete line of haulage equipment.

Industrial Concerns, Merchants and Farmers, having their own private transportation problems, naturally are anxious to adopt the right haulage system—be it trucks, tractors, trailers or what not.

With its four sizes of Trucks, its Tractor and Trailers, Watson is able to give unbiased advice concerning the best equipment suited to the needs of each particular case. Watson is selling NOT simply a UNIT, but a SYSTEM.

The line is flexible and covers all needs from that of a small, speedy delivery truck, up to that of a fleet of mixed mastodons of heavy hauling.

Write for particulars.

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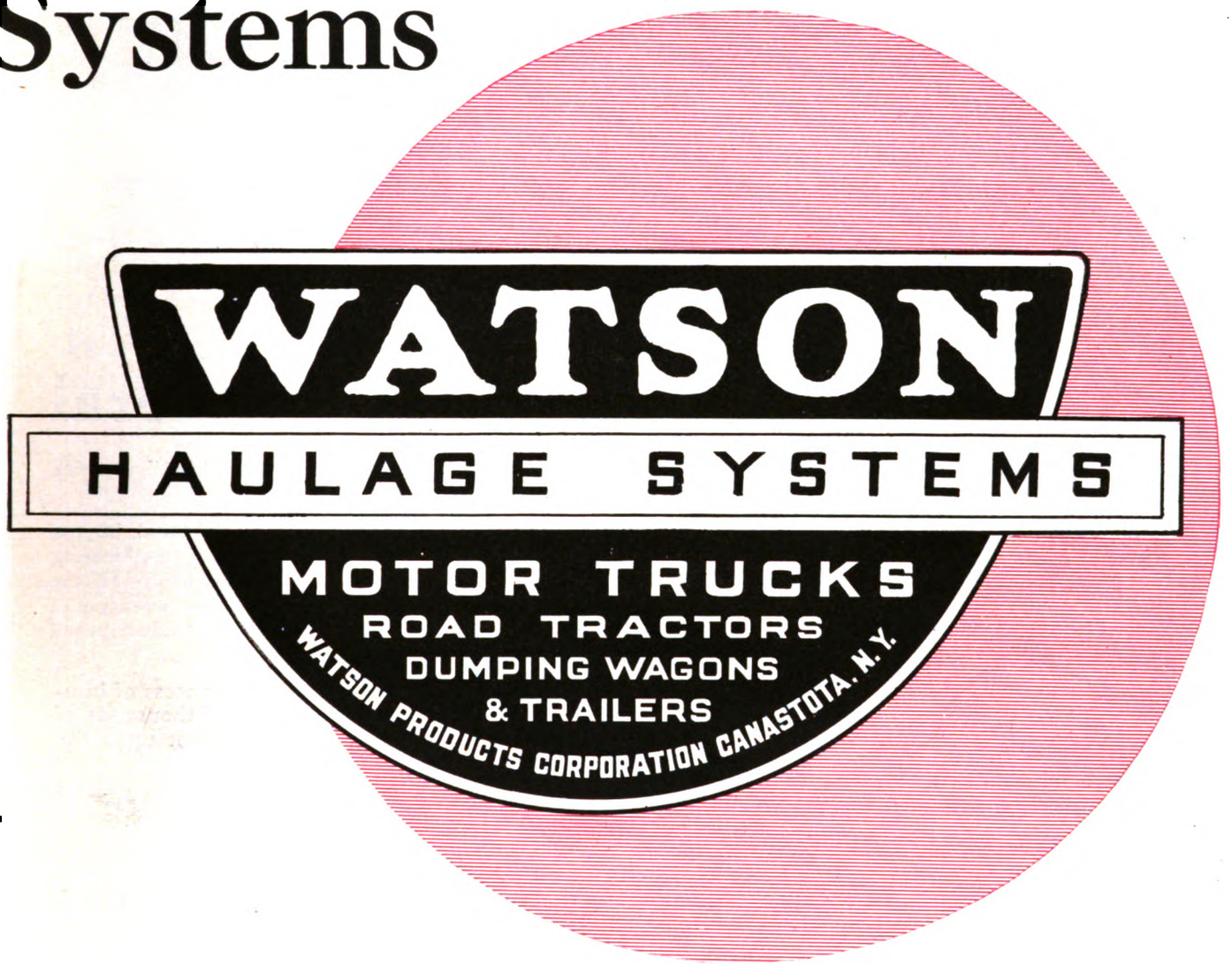
WATSON Systems



This Mark on Your Window

THIS identification Mark on a dealer's window is a notice to all who pass that not simply "trucks" are sold there, but that complete haulage systems, flexible enough to suit all practical needs, are obtainable within.

It is a symbol of breadth as well as character of service.

For the dealer it means a HUMAN relation with a manufacturer, the fundamental basis of which is a sincere desire for cooperation and a HUMAN understanding of the dealer's problems.

That Mark is worth having; for it means much and in many ways.

Write for particulars.

Watson Products Corporation, Canastota, N.Y.

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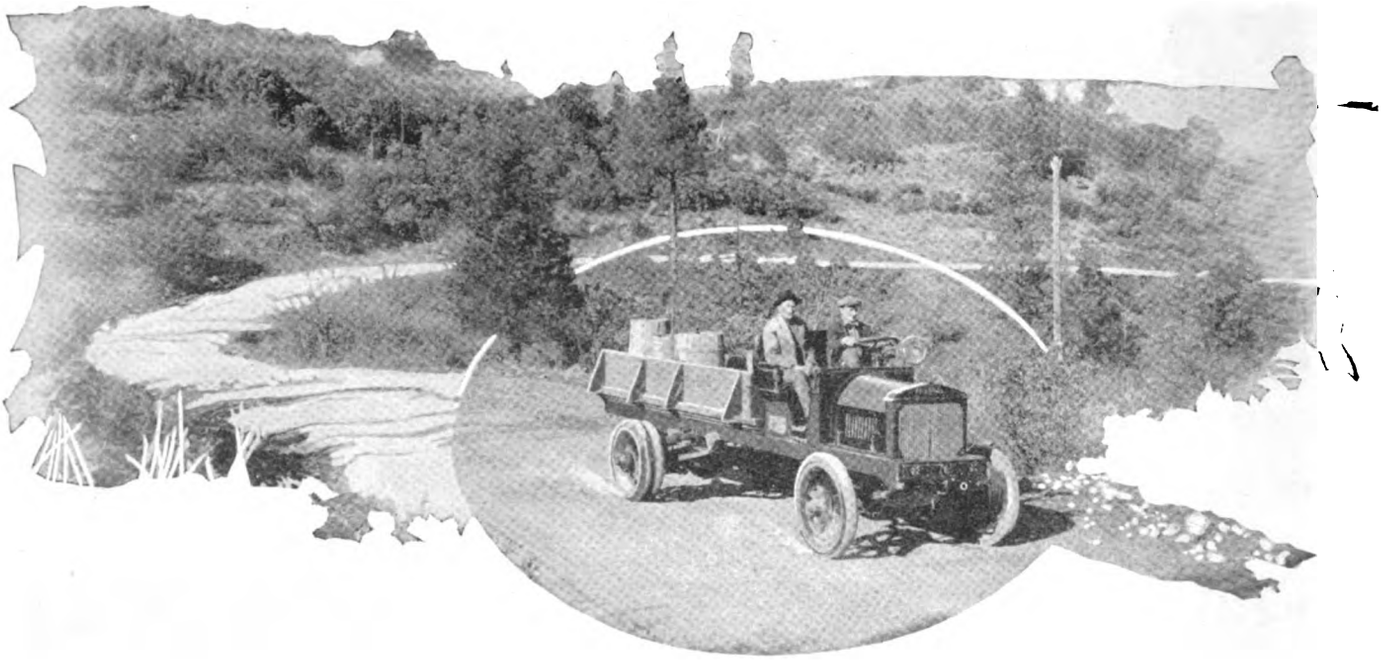

The Tenth Year Federal

Another FEDERAL

The TENTH YEAR FEDERAL TRUCKS

This is the sign of the "Tenth Year Federal," a sign significant of ten years of success in every field of truck transportation

Every dealer will realize what "The Tenth Year Federal" signifies in the kind of prestige that makes for a dealer's success.

Behind that phrase are ten long years of service to the truck buying public. Expressed in that phrase are all the efforts of our engineering department, our sales department, our advertising department,—all the efforts of our distributors and dealers—all the good performance of every one of the $50,000,000 worth of Federal Motor Trucks distributed throughout the world—every day of every year for ten years.

The Tenth Year Federal! It signifies success, the success of hundreds of Federal dealers and distributors, the success of thousands of Federal owners—all founded to greater or to less extent upon the success of the Federal truck.

But that phrase "The Tenth Year Federal" signifies something more than mere material success—it signifies firm adherence to manufacturing ideals and ideals of fair dealing with the public and with Federal dealers. The good will which the general public holds for Federal is found intensified in the loyal attitude of Federal dealers toward Federal.

The Federal Motor Truck Company is proud of that attitude—proud that it can deserve such loyalty as it finds among its dealers and distributors. That loyalty is one of the big reasons why there are so many Federals throughout the world today. And in that loyalty is to be found *one* big reason why Federal will continue to increase and multiply much more quickly in the future, even than it has in the past.

FEDERAL MOTOR TRUCK COMPANY
DETROIT MICHIGAN

FEDERAL

One to Five Ton Capacities

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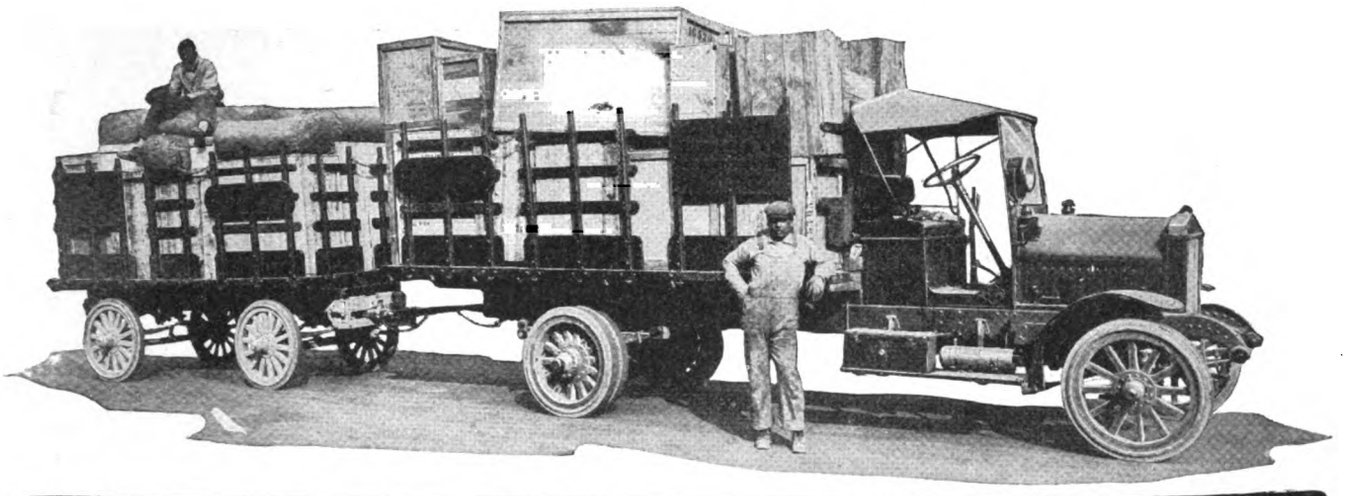

Seven Warner Trailers Save 30% to 35% in Tonnage Cost

This fleet of Warner Four Wheel Trailers is in every-day service hauling loads which average 5,000 to 7,000 pounds on short and long hauls. Warner Trailers *double* the carrying capacity of the trucks which pull them.

Form 1201

CLASS OF SERVICE | SYMBOL
Telegram
Day Letter — Blue
Night Message — Nite
Night Letter — N L
If none of these three symbols appears after the check (number of words) this is a telegram. Otherwise its character is indicated by the symbol appearing after the check.

WESTERN UNION TELEGRAM

NEWCOMB CARLTON, PRESIDENT — GEORGE W. E. ATKINS, FIRST VICE-PRESIDENT

RECEIVED AT

B187SA 93 COLLECT

SAN ANTONIO.TEX DEC 18 1919

$1.44 & 11E

WARNER MFG CO

BELOIT WISCONSIN

AMONG THE TRUCK TRAILERS IN CONSTANT USE BY THIS COMPANY ARE SEVEN WARNERS WITH BODY LENGTH FROM TEN TO TWENTY FEET THESE CARRY FIVE THOUSAND TO SEVEN THOUSAND POUNDS EACH THUS DOUBLING THE CARRYING CAPACITY OF OUR MOTOR EQUIPMENT AND EFFECTING A SAVING OF THIRTY TO THIRTY FIVE PERCENT IN TONNAGE COST WE USE THEM ON SHORT HAULS AND ALSO ON LONG INTERURBAN AND COUNTRY TRIPS WHERE THEY PROVE ESPECIALLY EFFECTIVE AND SATISFACTORY. THEIR CONSTRUCTION ELIMINATING THE WHIP WHICH FORMERLY CONSTITUTED A SERIOUS OBJECTION TO THE USE OF TRAILERS WITH MOTOR TRUCKS

MERCHANTS TRANSFER CO

Frequently WARNER TRAILERS cut hauling costs in half. Whether the loads are heavy or the hauls are long, the same consistent ton-mile saving is shown. Consider the experience of the Merchants Transfer Company as a guide to what you can save. Each WARNER TRAILER will double the work of your trucks.

No matter what line of business you are in, find out more about WARNER HEAVY DUTY TRUCK TRAILERS. There is a size and type for every hauling proposition from the Two Wheel Warner used in the oil and lumber fields to the Semi-Trailer with Patented Warner Ball and Socket Fifth Wheel and the Reliable Heavy Duty Four Wheel types.

Warner Trailers will be exhibited at the National Automobile Shows—New York and Chicago.

WARNER MFG. COMPANY
26 Main Street **Beloit, Wis.**

WARNER
HEAVY DUTY
TRUCK TRAILERS
TWO AND FOUR WHEEL TYPES

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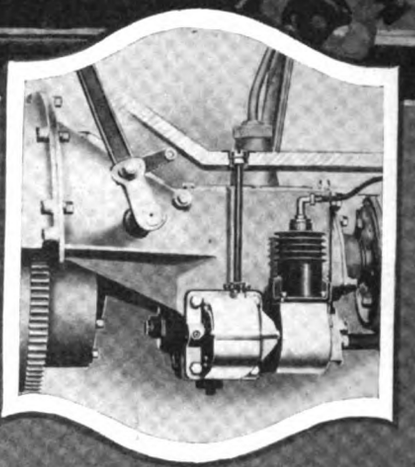

"Both are Passenger Cars"

THE light sport car and the 5th Avenue Bus are both passenger cars—but what a difference! Where the ordinary tire carrying an air pressure of 60 to 90 pounds will do for the passenger car, the heavy bus when it uses pneumatics must adopt the masterpiece of the tire maker's craft, the giant pneumatic with its pressure of from 150 to 175 pounds.

And yet the terrific pressure requirements of this big "passenger car's" tires can be met by the same make of air compressor as has served so well for its little brother—the Kellogg Engine Driven Tire Pump.

KELLOGG MFG. COMPANY
Rochester N. Y.

KELLOGG
Engine Driven
Tire Pump

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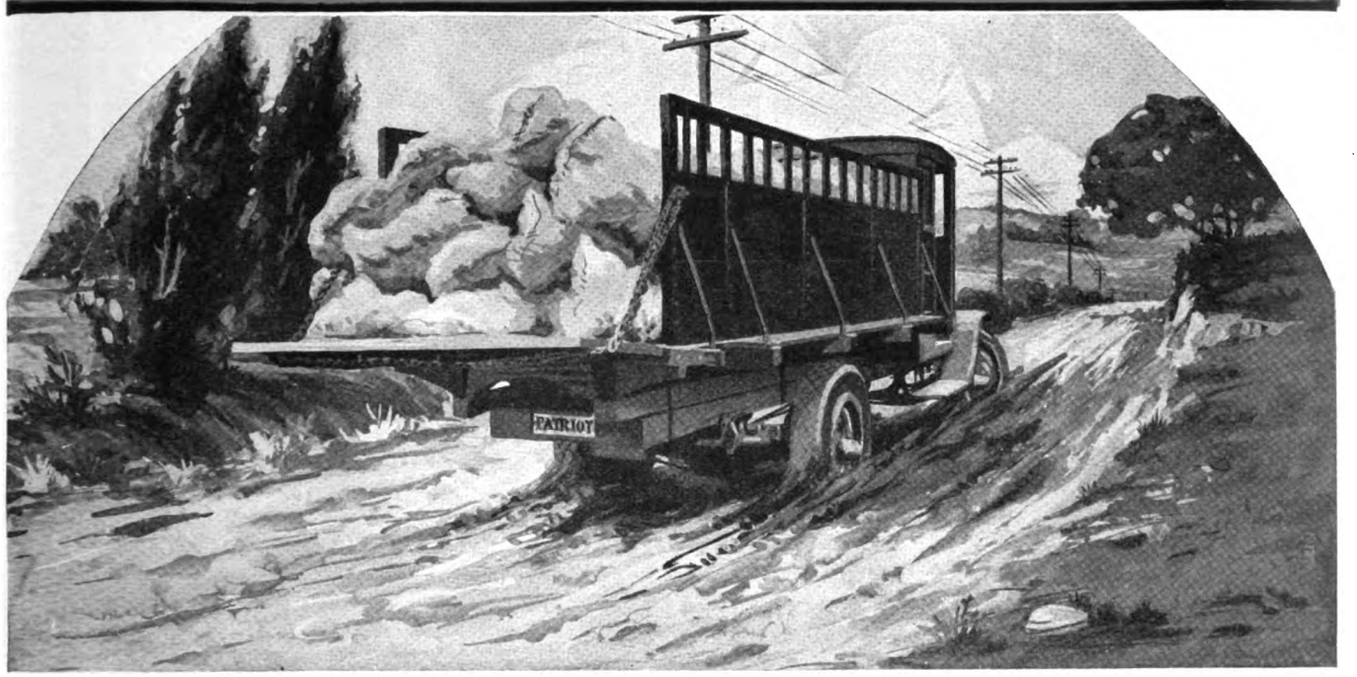
When It Comes to a Real "Show-Down"



PATRIOT

Motor Trucks "Go Through"

On paved hghways, no truck gives more satisfactory and economical service than the Patriot.

But if you want to see this unusual truck really perform—get right down and pull—send it charging through hub-deep mud, up slippery hills, through clogging sand, over newly plowed ground.

You will be astonished at the willing ease with which the Patriot answers unreasonable demands.

Patriot trucks were designed to stand up and deliver under the unusually difficult conditions. We expect the owner to use his Patriot every working day of the year, fine weather or foul, good roads or bad.

Patriots are easy to run and keep running. Few adjustments are necessary, little attention required.

Ask us to send you the new Patriot Catalog.

HEBB MOTORS COMPANY, Manufacturers

1419 P STREET, LINCOLN, NEB.

Revere Model	Lincoln Model	Washington Model
1500 to 2500 lbs. Capacity	3000 to 5000 lbs. Capacity	5000 to 7500 lbs. Capacity

Please mention "Power Wagon" when writing to advertisers.

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Large photograph: Goodyear Cord Tire after nearly a year of hard trucking service for Indiana Oxygen Company, Indianapolis. Insert: Goodyear-Cord-equipped truck of this company unloading cylinders in foundry yard

Copyright 1920, by The Goodyear Tire & Rubber Co.

GOODYEAR

Please mention "Power Wagon" when writing to advertisers.

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Pneumatics—and the Motor Truck Dealer

"WE make more deliveries and cover more ground on Goodyear Cord Tires than we ever could on solid tires—repairs are far less and our driver works better on them. We find Goodyear Cords tough and altogether economical." — W. L. Brant, Secretary and Treasurer, Indiana Oxygen Company, Indianapolis, Indiana

STATEMENTS like this one strikingly illustrate how perfected pneumatic truck tires are increasing the range and value of motor transportation.

In removing the limitations imposed by solid tires, the pneumatics have set free the full abilities of motor trucks to serve with utmost result.

Due to the Goodyear Cord construction, developed by Goodyear many years ago, the pneumatic truck tire has been made entirely practical and brought to its present high efficiency.

For it is this construction which underlies every element of advantage in the advanced pneumatic truck tire; its traction, resilience, toughness, nimbleness and all-around economy.

This development has opened to the motor truck dealer a vastly wider selling field by breaking down past objections to solid-tired trucks—insufficient traction, cushioning and activity.

It has equipped him to sell more motor trucks to more users and for more uses during the entire year and in parts of the country where it is impossible to drive a solid-tired truck.

The proof furnished by this extensive experience is a powerful aid in truck selling and can be obtained by motor truck dealers who write for it to The Goodyear Tire & Rubber Company, at Akron, Ohio.

CORD TIRES

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Citizens of the United States:

What are you planning to do

1920

Are you going to Talk, Talk, Talk
and Talk some more

Are you going to Theorize, Theorize, Theorize
and Theorize some more

Are you going to Confer, Confer, Confer
and Confer some more

Are you going to Spend, Spend, Spend
and Spend some more

Are you going to Speculate, Speculate, Speculate
and Speculate some more

Are you going to Strike, Strike, Strike
and Strike some more

OR

Will you work more
Will you produce more
Will you save more

That is the only way possible for real Americans to do their solemn duty and save the country.

There is no substitute for work

Our policy of doing business is founded on Quality and Service, and we pledge that our organizat on will not be found wanting in this world crisis.

The Autocar Company

Ardmore, Pa., Established 1897

Manufacturers of the Autocar Motor Truck

This message was first published by the Autocar Company in newspapers throughout the country during December, 1919.

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POWER WAGON

Vol. XXIV. CHICAGO, FEBRUARY, 1920. No. 183

46 Trade Associations Affiliated with N. A. D. A.

NUMBER TO BE DOUBLED IN 1920

How the state and local trade associations are affiliating with the National Automobile Dealers' Association and how the greatest harmony and coöperation exist between the two is shown in a report by Harry G. Moock, secretary and general manager of the national association, for presentation at the annual meeting in Chicago January 26-27.

According to Secretary Moock, there are now forty-six automotive trade associations affiliated with the national association, in which the local trade association pays en bloc the membership dues of its dealers, eligible for membership in the National Automobile Dealers' Association. In this list are five state associations, two inter-

(Continued on page 24.)

GMC Plan Ratified

At a special meeting of General Motors Corporation stockholders, a resolution passed by the board of directors authorizing change in the capitalization of the company was ratified. The Corporation Truck Company of America has placed on file a certificate of amendment to the charter, making the company's authorized capital as follows: $20,000,000 preferred stock, $90,0000,000 6 per centum debenture stock, $500,000,000 7 per centum debenture stock, all of $100 par value, and 50,000,000 shares of common stock without par value. The state tax in connection with the filing of this amendment amounted to $229,600, the largest corporation tax payment ever made in the state of Delaware.

Rewarded by Vice-presidency

After 18 years of service with the Hyatt Roller Bearing Company, B. G. Koether has been promoted to the vice-presidency of the organization and will leave Detroit in a short time for Harrison, New Jersey, where he will have his headquarters as head of the sales and advertising departments of the company. Mr. Koether was assistant sales manager of the company at Harrison, New Jersey, when he was promoted to sales manager 10 years ago and came to Detroit to take up his new duties. Mr. Koether's career with the Hyatt Roller Bearing Company is typical of the best American traditions. Eighteen years of untiring efforts and will to overcome all obstacles and unfailing optimism have brought him a fitting reward. He entered the employ of the company as an accountant. He was promoted shortly to purchasing agent and then assistant sales manager. In Detroit he served as sales manager and then as head of the motor bearings division of the company. It is this present position he leaves to become vice-president. He has been a director of the company for several years.

Mercer Interests Now in Control of Reorganized Locomobile Co.

Emlen S. Hare, president of the Mercer Motor Company, has been named as head of the recently reorganized Locomobile Company of America, which is to be known as the Locomobile Company. To be associated with Hare will be O. E. Hunt, H. S. Church, Henry Lansdale and C. L. Guyman, who until their recent resignations from the Packard Motor Car Company, held positions there of chief engineer of motor cars, chief engineer of motor trucks, car sales manager and government distribution manager, respectively.

The new Locomobile Company proposes to add to its present passenger car a medium-sized and lower-priced Locomobile. In addition, the company intends to build a line of motor trucks ranging in size from ¾-ton to 5-tons capacity.

The authorized capitalization of the new corporation will be 300,000 shares of no par value common stock and $5,000,000 7 per centum cumulative preferred stock ($100 par), of which 200,000 shares of common and $3,500,000 of the preferred stock will be issued at once. The authorized bonded debt will consist of $2,500,000 first and refunding mortgage 6 per centum bonds, due 1935, of which $1,416,000 will be outstanding.

Net profits of the Locomobile Company of America for the year ended June 30, 1919, were $1,249,823, after depreciation and taxes. The balance available for common on the basis of the new capitalization would be $930,000, or $4.65 a share.

Kockuk Heads Menominee

At a stockholders' meeting of the reorganized Menominee Motor Truck Company, Anton Kockuk, of Shawano, was chosen as president; W. A. Holt, of Oconto, as vice-president; J. A. Bell, of Clintonville, as secretary and manager, and Messrs. D. J. Rohrer, of Clintonville, and Chas. Hagen, of Appleton, were chosen as additional directors.

Packard Discards Tonnage Rating of Motor Trucks

DECLARES FACTORY SYSTEM ANTIQUATED

Factory tonnage ratings on Packard motor trucks are to be eliminated, and hereafter all models will be designated without reference to capacity, according to an announcement issued by the Packard Motor Car Company. In other words, the term "3-ton" truck, for example, is taboo. It will be known as "Size D." This radical step is in accordance with the company's plan of "selling the truck to fit the job."

"We are wiping out a trade custom that is not only unfair to our motor trucks, but

(Continued on page 75.)

International Motor Truck Deal Is Consummated and Output Soars

The plan and agreement under which International Motor Truck Corporation takes over the New Brunswick plant and other assets (amounting to approximately $8,000,000) of Wright-Martin Aircraft Corporation have been consummated.

When the consolidation is completed, International Motor Truck will have outstanding approximately $16,000,000 first and second preferred stock, both issues paying 7 per centum and being cumulative, and about 78,000 shares of common stock of no par value. The present corporation had issued and outstanding as of December 31, 1918, $4,243,771 first preferred and $2,656,449 second preferred with 52,733 shares of common of no par value carried on its books at $268,198. Although the books for the 1919 year have not yet been closed, it seems probable that the results for the twelve months' period which ended December 31 will show a balance for the common stock, after depreciaiton, preferred dividends and taxes, of better than $30 a share on the present junior issue.

The year ended December 31 last was the most successful in the company's history, shipments exceeding 5,000 trucks, with production at the end of 1919 running at the rate of 6,000 motor trucks per annum. As a result of enlargement of its existing plant facilities and by reason of the acquisition of the New Brunswick plant of the Wright-Martin Company, International Motor this year will be able to increase its output of motor trucks by 80 per centum to 100 per centum to a probable total of between 9,000 and 10,0000 machines.

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Return of Railways to Increase Sale of Trucks

FREIGHT RATE BOOST AFTER TRANSFER

Congestion of freight transportation facilities has already assumed a very serious aspect and this winter will experience difficulties that will surpass those of the winter of 1917, according to R. E. Fulton, vice-president of the International Motor Company. Mr. Fulton warns shippers to prepare now to meet the emergency.

"During the congestion of 1917 the motor trucks in use hauled 1,200,000,000 tons of goods," he says, "and this year with production greatly increased and the railroads crippled by the coal shortage, the demands upon the motor trucks will be many times greater. The inability of shippers of goods to get satisfactory service from the railroads has already caused many of them to use motor trucks, and if the present demand keeps up, the production of machines to meet the demand will be impossible. It is significant to note that the sales of Mack motor trucks last month increased 58 per centum over the month previous, and that this heavy demand is increasing steadily.

"Another point that shippers should not overlook is that the railroads are soon to be turned over by the government to their owners, and that increased freight rates, as a result of this, are inevitable. The Esch railroad bill, which aims to give the railroads a helping hand during the period of transition, has provisions which stipulate that the railroads shall immediately apply for increased freight rates. This certainty of increased railroad rates as well as the inadequacy of the railroads to give the kind of service that is being demanded points to an oversold condition in the high-grade motor truck market before very long. Business men in order to be sure that their freight will be handled should place their orders for sufficient motor transportation now, while deliveries are obtainable. The increased demand for motor trucks from foreign countries will also have a big influence on conditions. Export sales of Macks last month were the biggest yet, many going to Peru, Cuba, Norway, Argentina, Holland and Mexico."

Federal Trade Commission to Put Price Guarantees Under Spotlight

Washington, D. C., Jan. 20.—So general is the practice in the motor truck industry of guaranteeing prices against a decline that the industry stands to be vitally interested in the examination which the Federal Trade Commission is undertaking of the whole question of price insurance. As a beginning, the trade body has sent a circular letter to trade associations and individual producing and sales interests inviting expressions of opinion and the submission of any evidence favorable to or antagonistic to price guarantees. This mobilization of data is designed, however, merely to afford working material for a general hearing on the issue which is to be held at Washington some two or three months hence and at which all motor truck interests will be invited to be present.

According to the information that has reached the Trade Commission, price insurance in the motor truck industry usually takes the form of a guarantee given by the manufacturer against "own decline"; that is, against any reduction in his list prices within a given time. However, the federal inquisitors who are approaching this whole subject, they insist, with open minds, intend to, likewise, probe the practice of guaranteeing against a market decline and the guarantee against a competitor's decline. It has been brought out in the preliminary investigation that preceded the issuance of the blanket invitation, that certain manufacturers make it a practice to guarantee the prices that they announce early in the season against the prices to be made subsequently by other producers. It seems clear that this situation can be taken advantage of, if any price dictator sees fit to "pinch" the competitor who has thus obligated himself to match another's price. Not a few manufacturers who are now guaranteeing prices have whispered to the Trade Commission that they do not relish the practice and would like to abandon it were it not for the fact that the pace of competition compels them to offer this concession to customers or lose their business.

Test Shows Benzol Does Not Injure Internal Combustion Engine Parts

An official report has been issued by the Automobile Associaiton of England on the 10,000-mile benzole road test carried out on a touring car. The trial was organized with a view to discovering whether benzole of N. B. A. specification does or does not result in bad effect upon the modern internal combustion engine; examination of the engine and its parts at the end of the 10,000 miles produced no evidence of ill effects. Owners of both touring cars and business vehicles have been using benzole for many years with satisfactory results, but this is the first occasion on which a lengthy, searching and official test has been made.

Garford Motor Truck Company Increases Capital to $10,000,000

New York, Jan. 15.—President E. A. Williams, Jr., of the Garford Motor Truck Company, with factories at Lima, Ohio, has announced that the capital stock of the company has been increased from five to ten million dollars to provide for an extensive program of expansion. This expansion is necessary, Mr. Williams said, to meet the increased demands for the Garford product. It will provide for an increase in production which, within the next year, will be greater by 100 per centum than the present program.

While the detailed plans for expansion are not as yet complete, it was stated that one of the company's first moves will be to erect a modern addition to its factory, 400 feet by 100 feet. This building will be devoted entirely to the progressive assembly of Garford motor trucks. To provide for still further expansion, the company has purchased additional property adjoining its factories. This additional acreage will be utilized in the near future.

Declares Years of Plenty Await American Motors

CHRISTIAN GIRL OPTIMISTIC ON FUTURE

More settled industrial conditions, a continued increase in production and little prospect of an early lowering of prices are foreseen for the motor car industry by Christian Girl, president of the Standard Parts Company, of Cleveland, and vice-president of the Motor and Accessory Manufacturers' Association. When in New York recently, Mr. Girl said:

"The signing of the peace treaty, which we hope in some correct form will be accomplished during the next thirty days, will have a very beneficial effect upon the social conditions in America as well as the rest of the world. In our opinion labor will be more constant and will accomplish more in the year 1920 than in 1919. That prices will fall to any marked degree is not to be expected for a number of reasons. All material product is based upon the work of the hand and the brain, and the price of materials can only be lowered when there is less demand for the labor of the hand and brain than there is at this moment.

"It will take some years to restock the warehouses of the world, and until this occurs there can be no such thing as overproduction. There may be some unbalanced production, but no surplus of commodities in the average. All our debts have been contracted with a rising and inflated market and can not be paid with a deflated market. This is another reason for the general prices of materials remaining up. Demand for goods will exceed the supply. This will be especially true of the wonderful form of locomotion and transportation known as the motor car. In our opinion the demand for cars this next year will far exceed the demand in 1919 and should run from 3,000,000 to 3,500,000 cars, including motor trucks. Production will be limited by the ability of motor car manufacturers and parts makers to secure steel and other metals, and to secure labor with which to fabricate the same. Production will be nowhere equal to the demand, and if it should run at the rate of 2,250,000 cars for the year, it is possibly all that can be expected. Cars are being designed better than formerly and lasting longer. Replacement business will not amount to as much in proportion in the future as in the past, but this is in the tendency of greater economy in the entire industry and in the use of automobiles, and should be a benefit rather than a detriment.

"In our humble opinion, it will be impossible for supply to overtake demand within the next three years, after which the rehabilitation of other portions of the world and demand from them upon us for motor car means of transportation will be sufficient to afford an excellent market for our products for many years to come."

The system of working motor omnibuses with fixed stopping places which is being adopted in London is becoming popular.

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Packard Schools Teach Drivers Care of Trucks

COURSES CONDUCTED IN 14 CITIES

The cost of motor truck transportation can be greatly reduced by teaching drivers and owners how to drive and maintain their motor truck equipment. This fact has been proved by the Packard schools for instruction in motor truck operation. These schools, which are conducted by Packard distributers throughout the country, have turned out several thousand graduates, with the result that both the men and their machines have given more efficient service.

There are no enrollment fees for the instruction course, the hours are arranged so as not to interfere with the work of the chauffeurs, and there are no tiresome lessons or studies to prepare. The work consists in a series of informal conferences, and is practical rather than technical. No attempt is made to turn out expert mechanics or repair men, but effort is concentrated on making good drivers who can prevent trouble rather than cure it. Special stress is laid on making the minor adjustments that keep the motor truck in best running form, on detecting and correcting little troubles before they become big.

After the first lecture in which the motor truck structure and operation is made clear in a general way, subsequent sessions take up specifically such details as the gasolene system, cooling and lubricating systems, electrical system, clutch and transmission, steering, brakes and controls, loading and similar matters, the whole course covering from six to ten sessions. Where required, the course is supplemented by actual driving periods for demonstration.

Among the cities in which schools are now conducted by Packard distributers are New York, Boston, Philadelphia, Chicago, Kansas City, St. Louis, Cleveland, Indianapolis, Baltimore, Albany, Omaha, Scranton, Milwaukee and Detroit. Some of the Packard distributers, in addition to the motor truck instruction, conduct a separate course for owners and drivers of passenger motor cars.

The certificates issued by the schools to those who complete the course are recognized as a guarantee of a driver's ability by any Packard branch, and the certificates in Detroit are accepted by the city authorities as evidence of the holder's competency as a motor truck operator.

M. A. M. A. Elects Officers

At the first meeting of the 1920 board of directors of the Motor and Accessory Manufacturers' Association, held January 8, officers were elected and committees appointed for the new year. With one exception the 1919 officers were re-elected. Thomas J. Wetzel, one of the retiring members of the board of directors, is succeeded as secretary and assistant treasurer by G. Brewer Griffin, manager of the automobile equipment department, Westinghouse Electric & Manufacturing Company, New York, a new addition to the board. Considerable changes were made in the make-up of the various committees of the board of directors, but the chairman in each case remains the same.

The officers for 1920 are: C. E. Thompson, president, Steel Products Company, Cleveland, Ohio; E. H. Broadwell, vice-president, the Fisk Rubber Company, Chicopee Falls, Massachusetts; Christian Girl, vice-president, Standard Parts Company, Cleveland, Ohio; W. O. Rutherford, vice-president, the B. F. Goodrich Company, Akron, Ohio; L. M. Wainwright, treasurer, president, Diamond Chain & Manufacturing Co., Indianapolis, Indiana; and G. Brewer Griffin, secretary and assistant treasurer, manager automobile equipment department, Westinghouse Electric & Manufacturing Company, New York.

Uncle Sam's Solons Do Not Favor Reductions in Automotive Taxes

Washington, D. C., Jan. 21.—Motor truck tradesmen who have, these past few weeks, written to their senators and representatives in congress inquiring as to the prospect for a revision downward or a remission of the taxes upon motor vehicles, parts and accessories have not received very encouraging replies. Although scant hope can be held out that automotive taxes will be wiped off the slate there is some prospect of legislation at this session of congress to clear up certain complications that have arisen in connection with the administration of the Revenue Act of 1918. One change that has been advocated involves the editing of section 900, paragraph 3, which provides a tax on tires, inner tubes and automobile parts and accessories sold or leased by manufacturers and producers. It is suggested that manufacturers of motor trucks and other motor vehicles should be declared by law to be manufacturers of tires, inner tubes, parts and accessories which are purchased and resold by them because it is impracticable to keep separate records of the parts and accessories which are actually manufactured and which are purchased from other manufacturers.

Some interests in the motor truck and allied lines would be affected also by the contemplated action which would strike out the next to the last paragraph of section 900, which is the section that covers "automobile trucks" and "automobile wagons." The paragraph which it is proposed to do away with entirely is one that stipulates that where a manufacturer or producer sells his articles both at wholesale and retail the tax in the case of any article sold at retail shall be computed on the price for which he sells like articles at wholesale. Complaint has been made that this plan works a hardship on manufacturers, especially small manufacturers who sell only at retail.

Give Up 114 Miles of Track

Automobiles and motor trucks carrying passenger and freight for hire caused abandonment in 1919 of 114 miles of track by electric railway companies in New York state, according to the New York Electric Railways Association, which seeks regulation of motor 'bus lines.

Toledo Plans 'Bus Lines To Parallel Car Routes

75 DOUBLE-DECKERS TO BE ORDERED

The establishment of 'bus lines to run parallel with the city car lines, and the inauguration of a complete 'bus service in Toledo, Ohio, by April 1 is the plan of the Transfer 'Bus Company, for which papers of incorporation are now in Columbus. The plan includes the sale of $1,000,000 worth of bonds in $100 denominations in Toledo, the purchase of 75 double-decked 'buses with a seating capacity of 48 each. The 'buses will cost $7,500 each and will cost the operators 33 cents a mile or about $3.30 an hour.

At the present time the company, which is an association of 'bus owners, is operating 75 'buses for a five-cent fare and a one-cent transfer. The officers say that with the support of Toledoans they can continue to operate at this fare and make money while giving services. One of the chief advantages of the 'bus lines is the cross-town line.

The 'bus owners met in the City Hall recently and discussed the plans for the purchase of 'buses from the Bethlehem Motor Company. Henry W. Ashley and John B. Merrell of the Municipal Ownership Commission, appointed by Judge Killits, were among those present. The following officers of the Transfer 'Bus Company are given in the list of incorporators: President, Glen Conrad; vice-president, Paul Gattrell; secretary, A. L. Whitney; treasurer, L. J. Griswold, and general manager, G. J. Maxwell.

Republic Names New Heads

The Republic Motor Truck Company, Inc., of Alma, Michigan, announces the appointment of O. W. Hayes, general manager, and Thomas M. House general sales manger. Both these men have been connected with the Republic company almost from its beginning, Hayes having formerly been in charge of the purchasing department, designing, engineering and latterly factory manager. House was formerly eastern division sales manager with headquarters in New York City and latterly Pacific Coast sales manager.

St. Louis Show February 16

St. Louis will hold two automobile shows —a passengar car and accessory show at the Southern Hotel Building, and a commercial car show at the Coliseum with one admission by coupon tickets to both shows, both during the week of February 16 to 21. Free motor busses will run between the two shows. Robert E. Lee is general manager of both shows.

Scriptural Fulfillment

Twenty horse-drawn cabs that represented an original expenditure of more than $25,000, or $1,250 apiece, have been sold at auction by the Muncie Transfer Company, of Muncie, Indiana, for a total of $800, or an average of $40 apiece. Most of them will be converted into "trailers" for motor trucks.

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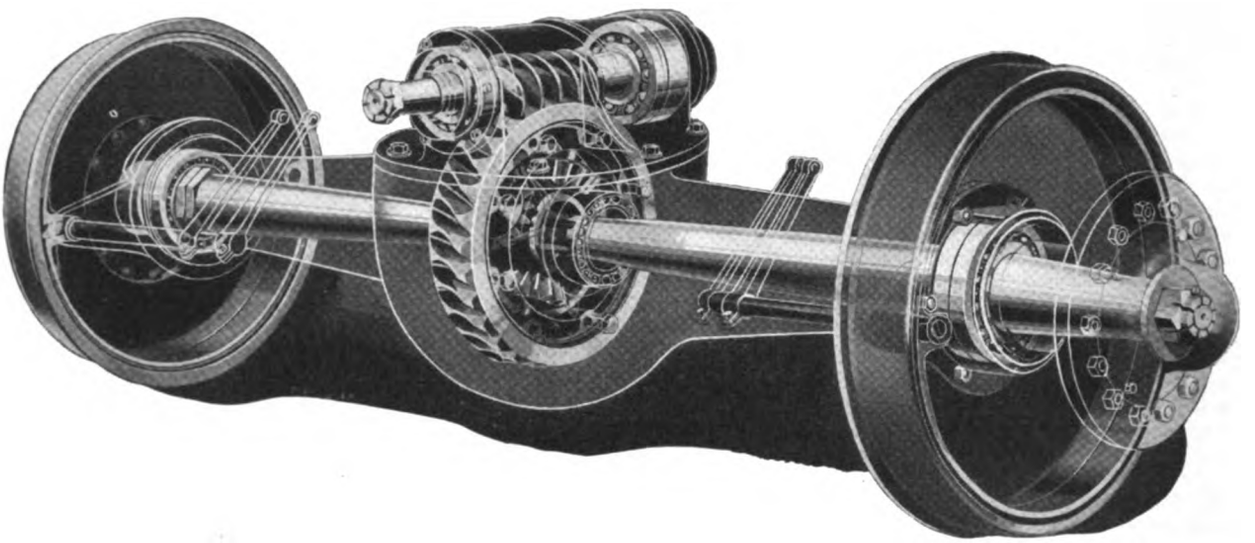

Axles Plus Service

With the Motor Truck Builder, it is not always the problem of axles, but more nearly, **axles plus service.** With your truck building program worked out and adopted, your sales agencies furnished with final schedules of truck shipments, service by the Axle Builder is just as important as the product he furnishes. Ability to properly serve, as well as to manufacture, must always be the real test in the problem of efficient axle distribution.

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POWER WAGON

An exponent of the most enlightened thought and practice of the motor truck industry.

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THE POWER WAGON PUBLISHING COMPANY

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Motor Truck Shows

THE holding of motor truck shows of national scope has always involved serious problems in management, and it is not to be expected that these will decrease while the industry maintains its present rate of growth. One of the chief difficulties, particularly in recent years, has arisen in the effort to provide suitable quarters for housing the enormous exhibitions which have been demanded by the large number of exhibitors and the wide range of products. The casual visitor at any show within the last five years must have been impressed with the hampering occasioned by restricted space, and certainly the exhibitors themselves have suffered from what was apparently an unavoidable situation. But this year, more than heretofore, the general public has felt keenly the hardships of out-of-the-way exhibitions made necessary by the inability to obtain show space of ample proportions in a convenient location.

Such seemingly insurmountable obstacles do much to retard the public's interest in motor truck shows, especially when the exhibition is housed in a building, in one case, more than a dozen miles from the heart of the city and, in the other case, in the midst of a filthy and foul-smelling district given over to the business of animal slaughtering. It was, of course, no discriminating choice which determined the selection of such sites, since there was no opportunity for exercising a preference, and our great regret must be that neither of the country's two largest cities is able to provide sufficient suitable exhibition space for the concurrent display of passenger-cars and motor trucks.

The advantages of holding the two exhibitions at the same time probably can not be outweighed by the disadvantages of holding them at widely separated points, but there is no question that some other solution must be found. The most visible result of the present arrangement is to be seen in the gate receipts, by which the success of each exhibition is always judged. It is easily possible that attendance may fall off to such an extent that motor truck shows will become an unwarranted expense through the defeat of their chief objects, and we do not believe that the industry will view with anything short of misgiving an enforced policy against shows.

Few, we believe, will deny the great value of keeping the automotive industries in the public eye, just as other large movements in commerce make their periodical appeal to public interest, so that some way of circumventing the present, and apparently permanent, difficulties must be devised. Perhaps the remedy lies in the provision, by the industries interested, of suitable buildings in the two great commercial centers, wherein the ever-growing demands of these expanding trades can be met. We have no doubt that the industry could very easily underwrite the first cost of such a venture, and could even more easily make sure of a continuous and profitable return on the investment. Under such a plan, the site could be chosen almost at will, the time for exhibitions would always be under the industry's control, the availability of exhibition, convention, office and store space for rental purposes would provide an attractive revenue, and the existence of such large buildings would in a sense typify the magnitude and solidarity of the motor vehicle industries which they would serve.

Owners' Organizations

IF any doubt exists concerning the practical value of motor truck owners' organizations, it certainly does not reside in the minds of their members. The latter witness almost daily very striking demonstrations of the potency of concerted action and of the great utility of the exchange of opinions made possible by periodical meetings. Especially in matters pertaining to legislation are the advantages of united effort and combined resources made evident, but other avenues of work are open to those bodies which have the foresight to read the future and the astuteness to realize to the fullest extent the many and varied possibilities of organized activity.

The spirit of organization among motor truck owners, which has been so splendidly developed by some associations such as the one in Chicago, should be fostered in every community where the present use of motor trucks promises sufficient interest. No better means have been provided for protecting the owner's interests against the ravages of uninformed legislative action, no more valuable medium exists for the mutual improvement and enlightenment of motor trucks owners, and surely there is no better channel through which the manufacturer and his sales representatives can impress upon the buyers and themselves the community of interest which should be cultivated between the three groups. There is hardly a phase of motor truck application and use that could not be made the subject of careful investigation, discussion and action between them, and the owners' organization is an effective, convenient and logical meeting-ground. In no other way, in our opinion, will the great mass of valuable information in the custody of each group be made

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available for the betterment of the others; in no other way can the present misunderstandings and misgivings be so easily eradicated.

Coöperation on the part of the motor truck industry is needed in the formation of new owners' organizations to crystallize the latent spirit of combination that is often merely awaiting the encouragement of a guiding hand. The industry may be said to know a great deal of the problems and advantages of organization, and this information should be placed at the disposal of those who, although lacking in knowledge, are not wanting in good intentions. There will be no end of points at which the interests of the various groups will be found to converge and merge, whether these touch legislation, design, selling methods, operation, accounting, drivers, service, or any of the hundreds of other problems of the industry, and each group will have no trouble in discovering the ways in which mutual help can be made effective and profitable.

Use of Motor Trucks

THE rapidly increasing use of motor trucks affords cause for much satisfaction on the part of those who have had most to do with it, and at no other time have the prospects of further growth been more auspicious. There will soon be published statistics concerning the yearly use of motor trucks in various leading industries, which will, we believe, prove something of a revelation to many who pride themselves on their knowledge of the facts of this industry. These data, which represent patient research work extending over a decade, will show that the number of machines in use by American business concerns has increased at the rate of nearly 150 per centum annually for the last seven years, and that approximately one and one-half billion dollars have been spent by those commercial houses for motor equipment.

Production figures for the year just closed are not yet available, but it is expected that they will show an output equal to not less than 230,000 motor trucks and possibly as large as 250,000. Should the higher of these two figures be attained, the number of machines in use on January 1 of this year will appear as approximately 640,000, indicating an increase of more than 150 per centum as compared with the same time of 1919. The number of motor trucks in use in the United States has grown from less than 10,000 in 1910 to certainly more than 600,000 in the beginning of 1920—a period of ten years. The figures by years follow: 5,501 machines in use on January 1 of 1910; 10,973 in 1911; 22,448 in 1912; 45,102 in 1913; 68,386 in 1914; 90,940 in 1915; 136,690 in 1916; 194,035 in 1917; 278,257 in 1918; 419,064 in 1919; and (probably) 630,000 on the first day of this year.

An interesting feature of the statistics will be found in the record of machines operated in fleets of five or more vehicles each. Of such installations there were on January 1 of last year no less than 13,562, including 96,349 machines valued at approximately $268,767,200. This indicates an increase of more than 150 per centum in the number of owners, and an increase nearly as great in the number of machines as compared with the same time of 1918. The corresponding figures for the first of this January should be approximately 20,000 concerns, 140,000 machines, and a value of $400,000,000.

Motor Wagon Life

THE life of motor trucks has formed the subject of many articles and not a few discussions, but only within recent months has it been made the topic of advertising appeal to the buying and selling public. While most of the articles have been radiant with optimism born of unlimted faith and have breathed a hopefulness that often bordered on rash prophecy, they were unfortified by fact for the very simple and sufficient reason that the fact was not available. Lately, however, the records of economy, efficiency and durability have been accumulating rapidly with the growth in the use of machines and the increasing care given to watching their performance, and it is now possible to substantiate many of the bold assertions of former years. The claims for motor wagon longevity have been vindicated.

It is now no uncommon thing to read, in some of our best and most instructive trade advertising, of the remarkable records of some quite old and certainly well worked machines. Those who used to argue for a scheme of depreciation based on an estimated useful life of 100,000 miles, and who won little beyond scorn or good natured toleration for their pains, now enjoy the satisfaction of seeing the proof presented in convincing form and volume. One manufacturer has repeatedly drawn attention to the fact that numerous machines of his make have reached that mileage, while many others have exceeded it, some being still in service after more than 300,000 miles of economical travel. On an estimated average daily mileage of 50, which is very common in many lines of trade, this means, in the maximum case cited, a time-life of twenty 300-day years, or at least ten years, were the daily mileage as high as 100. Even a life of but 200,000 miles indicates a time-life of 13 years and 4 months at the rate of 50 miles a day. In such a case depreciation, considered as an annual rather than as a mileage charge, is no greater than 7.5 per centum instead of the 33⅓, 25 and 20 per centum figures so frequently employed by operators.

Such records should not be held exceptional, in the sense that they can only seldom be attained. They are the fruits of a product that has been well made and well maintained. Their uncommonness is to be explained largely by the facts that most motor trucks are often poorly applied and indifferently cared for by their owners and that record-keeping is still counted a hobby. Long life in a motor truck is not a thing of rare occurrence, but the proof of it unfortunately is. When cost-keeping becomes a universal practice among motor truck operators and when intelligent maintenance becomes more than a phrase, we shall expect to see many evidences of motor wagon longevity, couched in language fully as convincing as that of a recent advertisement, which stated that "Forty-eight of the first fifty ——— trucks are in operation after eight years."

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The 1920 edition of the "Reference Book" will contain 92 full pages (9x12 inches) of specifications of motor trucks, trailers, farm tractors and passenger cars. There will be approximately 134 pages of blue prints of these models, showing plan and elevation views. The 500 pages of text, in addition to the above, will afford a vast volume and great range of information to all who are interested in the production, sale or application of trucks, trailers and farm tractors.

The "POWER WAGON REFERENCE BOOK FOR 1920" will be the most useful piece of trade literature ever printed. Its purpose is to supply the vital facts of the industry and, through their presentation, expand the market.

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48 Vice-Presidents Will Aid N.A.D.A. Organization

EACH STATE REPRESENTED ON BOARD

A real representation of the automobile dealers of the United States, an object for which the National Automobile Dealers' Association has been striving since its organization, has been assured by the building up of an advisory board composed of one dealer in every state, according to announcement by Harry G. Moock, secretary and general manager of the association. These men are to be known officially as the board of vice-presidents, and with thirty-one of the forty-eight chosen, Secretary Moock has called them to meet with the board of directors of the National Association Saturday, January 24, preceding the annual dealers' meeting at the La Salle Hotel, Chicago. Monday, January 26.

The directors of the association have been three months selecting the thirty-one officers already chosen, and the same meticulous care will be exercised in naming the remaining seventeen. These thirty-one have been selected from a number of recommendations to the directors by the prominent and influential dealers of their states. It has been the aim of the association to obtain men who stood in the forefront of progress in their states, men who appreciate the necessity of organization, and men with administrative ability. In a measure, these vice-presidents will be the personal ambassadors of the dealer association in that state. It will be their duty to work for a proper correlation of the national association with the state and local automobile trade bodies.

"This is a big step forward," Moock declares. "Around these vice-presidents will be built the work of ever organizing, stimulating and strengthening the local and state trade associations.

"It is our aim to make the National Automobile Dealers' Association the ultimate in commercial trade association development. Our industry is the third largest manufacturing business in the country and promises to become the second. Sales run into the billions of dollars. The pre-war unit of sale was $736. Doubtless this has increased until it is around $1,000 by now.

"This unit of sale is so important that no assault made on any part of the industry must pass unrestricted. No one dealer can prevent that. No handful of dealers can do it. All the dealers must stand together, unified, solidified, ready to resent any attack upon the whole structure of the industry.

"This can be accomplished only by organization. This organization can be accomplished best through the National Automobile Dealers' Association. The dealer association's method will be developed by the state vice-president idea."

Those whose selection has been officially announced by the directors of the N. A. D. A. follow:

Alabama, L. J. Adams, Mobile; Arizona, George H. Reuben, Phoenix; Arkansas, C. G. Faulhaber, Little Rock; California, Royal Miller, Sacramento; Colorado, Tom Botterill, Denver; District of Columbia, R. J. Murphy, Washington; Florida, Claude Nolan, Jacksonville; Georgia, R. A. McCord, Macon; Idaho, Warren Paul, Pocatello; Illinois, H. B. Pinkerton, Peoria; Indiana, N. H. Cartinhour, Indianapolis; Iowa, J. R. Rude, Marshalltown; Kansas, W. H. Imes, Topeka; Louisiana, George D. Wray, Shreveport; Massachusetts, A. J. Shorey, Boston; Minnesota, H. B. Knudsen, Duluth; Mississippi, T. J. Hines, Jackson; Missouri, M. L. Cowden, Springfield; Montana, A. T. Heaney, Great Falls; Nebraska, Guy L. Smith, Omaha; Nevada, E. D. Mack, Reno; New Mexico, A. R. Davis, Raton; New York, E. J. Ellis, Rochester; North Carolina, Lindsay Fishel, Winston-Salem; Oklahoma, M. H. Randall, Oklahoma City; Oregon, M. O. Wilkins, Portland; Pennsylvania, George MacFarland, Harrisburg; Rhode Island, C. H. Everett, Providence; Utah, A. G. Randall, Salt Lake City; Washington, P. E. Sands, Seattle; Wisconsin, Jesse Smith, Milwaukee.

States in which vice-presidents remain to be chosen are Connecticut, Delaware, Kentucky, Maine, Maryland, Michigan, New Hampshire, North Dakota, Ohio, South Carolina, South Dakota, Tennessee, Texas, Vermont, Virginia and West Virginia.

46 Trade Associations

(Continued from page 17.)

sociations. During 1920 it is probable that state associations and thirty-nine local as this number will be more than doubled, as many other local associations are framing their program for the year to become affiliated with the national association.

The interstate associations affiliated are the Carolinas (North and South) Automotive Trades Association and the Rocky Mountain Automotive Trades Association. The state associations are the Georgia Automotive Dealers' Association, the Florida Automotive Dealers' Association, the Automobile Trades Association of Kansas, Texas Automobile Dealers' Association and the New Jersey Automobile Trades Association. The local associations affiliated are Chicago Auto Trades Association, Chicago, Illinois; Boston Auto Dealers' Association, Boston, Massachusetts; St. Louis Auto Manufacturers' & Dealers' Association, St. Louis, Missouri; Kansas City Motor Car Dealers' Associaiton, Kansas City, Missouri; Motor Car Dealers' Association of Los Angeles, California; Buffalo Automobile Trades Association, New York; Utica Motor Dealers' Association, New York; Syracuse Automobile Dealers' Association, New York; Rochester Automobile Trade Association, New York; Albany Automobile Dealers' Association, New York; Memphis Automobile Dealers' Association, Memphis, Tennessee; Atlanta Automobile Association, Atlanta, Georgia; Louisville Auto Dealers' Association, Louisville, Kentucky; Little Rock Auto Dealers' Association, Arkansas; Youngstown Automobile Dealers' Association, Ohio; Minneapolis Automobile Trades Association, Minnesota; Omaha Auto Trades Association, Inc., Nebraska; Grand Rapids Automobile Business Association, Michigan; Indianapolis Automobile Trades Association, Indiana; Worcester Auto Dealers' Associaiton, Massachusetts; Pasadena Auto Trades Association, California; Terre Haute Automobile Dealers' Association, Indiana; Charlotte Automotive Trades Association, North Carolina; Quincy Automobile Trades Association, Illinois; Springfield Automobile Dealers' Association, Illinois; Jacksonville Automotive Dealers' Association, Illinois; Decatur Automobile Trades Association, Illinois; Logan County Auto Dealers' Association, Lincoln, Illinois; Fort Wayne Auto Trades Association, Fort Wayne, Indiana; La Crosse Auto Trades Association, La Crosse, Wisconsin; Des Moines Automobile Dealers' Association, Des Moines, Iowa; Auto Trades Association of Champaign County, Champaign, Illinois; Hannibal Automobile Dealers' Association, Hannibal, Missouri; Automotive Association of Mattoon, Illinois; Galesburg Automotive Dealers' Association, Galesburg, Illinois; Springfield Auto Dealers' Association, Springfield, Missouri; Evansville Auto Dealers' Association, Evansville, Indiana; Christian County Automotive Dealers' Association, Taylorville, Illinois; Alton Automobile Dealers' & Accessories Association, Alton, Illinois.

Gotham Trucks Increase 53 Per Cent in 3 Years

49,849 MACHINES IN CITY IN 1919

Motor trucks have increased 53 per centum in three years in what is known as the New York City district, according to a recent statement by the local branch of the Secretary of State's office. This district includes Greater New York and five surrounding counties.

In 1917 licenses were issued for 32,577 motor trucks, in 1918 there were 41,385 and in 1919, up to December 1, 49,849. In other words, 17,242 motor trucks have joined the traffic in New York streets in three years.

This announcement has caused considerable comment in the New York newspapers on the effect of commercial motor vehicles on the city's traffic conditions. It has been interpreted by some to the effect that this increasing use of motor trucks is responsible for the increasing traffic congestion on the main thoroughfares of Manhattan.

A statement made public recently by the International Motor Company answers this criticism by showing how much greater the congestion would be if it were not for the motor truck. The percentage of increasing congestion in relation to the percentage of increasing demands for transportation has, as a matter of fact, been kept down by the economies offered by motor trucks. Their flexibility in traffic, speed and larger capacities make them more desirable than horse-drawn equipment and the very fact that their use has increased to this extent proves that they are an economic necessity to the city and should not be discriminated against.

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Timken's Columbus Plant to Meet Industry's Needs

NEW FACTORY NOW IN PRODUCTION

There have, within the past year, repeatedly been times when the progression of the automotive industry has been limited by the available production of such essential parts as high-grade, anti-friction bearings. The demand, constantly growing, has been—more bearings. Timken's answer to the obligation it feels to that industry to which it has contributed so greatly, is a new and complete plant at Columbus, Ohio. This is a complete bearings production unit representing in its up-to-date buildings, equipment, and plan an investment well over $2,000,000. It, with a maximum enlargement at the Canton plant, assures Timken users and prospective users of a steady, and in every sense, dependable source of supply.

With the selection of Columbus, several shops were leased and operations on tools, special dies and machines accelerating the completion of the new plant were begun under the direction of a force selected from the Canton plant. These were the forerunners of the from 2,000 to 2,500 men that will complete the personnel. To house them, the plant of the Superior Die, Tool & Machine Company, on Buttles Avenue, was leased. As the work expanded, an adjacent building of the Structural Steel Company was procured and the tool room enlarged. In a very little while actual production of bearings began with the installation of about three dozen roll automatic and screw machines in the newly leased building. Hardly had the contractors finished the roof of the new main building before Timken millwrights began setting up screw machines.

The main building—approximately 500 by 300 feet—when completed, will be without partitions. The cold weather, however, necessitated that if machine work on a precision product were to be well done, it would be necessary to enclose that part of the shop where the work was actually being carried on; consequently, as the sides, roofs and floors are finished, the temporary partitions are moved so that now one-third of the floor space of 140,000 square feet has been given over to actual production while the remainder of the building is being finished. The obligation which the Timken Roller Bearings Company feels it owes to the automobile and automotive industries permitted of the waste of not a second.

Vigorous but extensive study was given the locating of the new factory. The forceful factors in this determination were: a location as central regarding distribution to the automotive industry as a whole, railroad facilities considered, as it was possible to find; a location near the source of the several fuels utilized during manufacture; a town of a nature little receptive to labor disquietudes; one where housing and living conditions were as good as it is possible to find; and a town abundant in skilled labor by reason of its steady, if not conspicuous, manufacturing growth. No thought was given to what are commonly called bonuses or free sites.

Columbus, Ohio, was selected as a place where the Timken Roller Bearing Company could best fill its capacities as a powerful and necessary agency toward the development of the automotive industry. The plot in Columbus upon which the Timken Roller Bearing Company has erected what are undoubtedly as well-planned, well-equipped, well-ventilated, well-lighted and completely coördinated buildings as there are in the country, is slightly more than nine acres. It is within ten minutes' street car ride of the downtown district, and even closer to substantial residential districts. Both Cleveland Avenue and Fifth Avenue, upon which it is located, are paved highways, Cleveland Avenue carrying a main street car line.

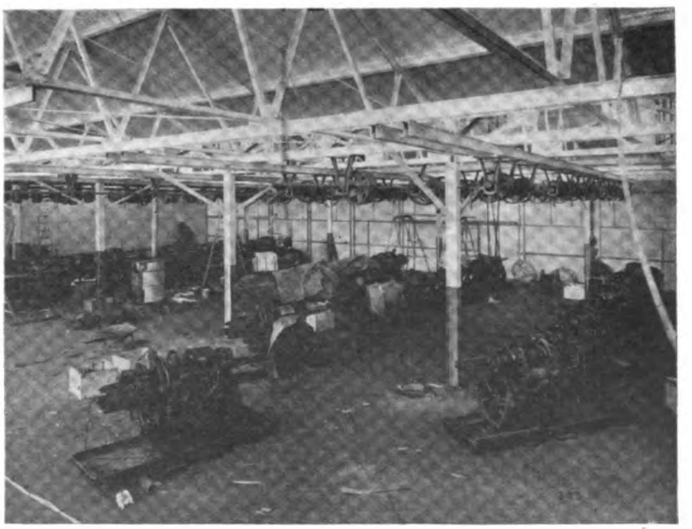
The Columbus plant in full operation will be a complete bearings production unit, producing all parts of all sizes of bearings. More than 18 years' experience in the successful building of Timken tapered bearings has been put into a consummate bearings manufacturing plant. The heat-treating plant, also a structural steel building of about 15,000 square feet, is a model of up-to-date efficiency of organization in the heat refinement of steel. It measures approximately 340 by 60 feet. The installation at Canton of its own source of raw material supply was Timken's means several years ago of meeting the then abnormal demand. Now an extensive enlargement in the steel and tube mills at the home plant just nearing completion will enable the Timken company to furnish its new plant sufficient raw stock in steady supplies.

Central Kentucky Truck Dealers Are Organized

FORM ORGANIZATION AFTER TRUCK TOUR

LEXINGTON, KY., Jan. 2.—An organization of the motor truck dealers of this city and vicinity had long been under consideration, and as a result of the impetus given the matter of motor truck transportation by the visit of the train of machines from Cincinnati, which arrived here on December 9, an organization under the name of the Central Kentucky Truck Dealers' Association has been formed, and it promises to be a potent factor in the extension of motor truck transportation. The officers of the new association are: President, W. R. Williams, of the W. R. Williams Motor Company; vice-president, Fred Bryant, of the Phoenix Motor Car Company; secretary and treasurer, W. L. Morris, of the Goodyear Tire & Rubber Company; assistant secretary and treasurer, J. E. Kittrell, of the Kittrell & Callaway Automobile Company. The present roster of members includes the names of nineteen dealers in this section of the state, and it is the intention to have all associate dealers become members. Much enthusiasm has been manifested in the new association, and the officers and moving spirits in the organization are much encouraged by the outlook. Plans are being made for a tour of Central Kentucky which will be held about April 1. About fifty motor trucks are expected to be entered in this tour, which it is thought will be a big boost for motor truck transportation, this section being an ideal one for the use of such service.

Main building Timken Columbus plant.



New machinery for Timken plant.

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Highway Problem Assumes New Aspect

Shortage of Building Material and Transportation to Enter Road Construction Program During 1920

FUNDS available for the construction of hard-surface roads in the United States in 1920 are more than three times greater than in any previous year. The United States Department of Agriculture estimates the amount at $633,000,000, and many leading authorities believe the appropriations will reach a final total of $1,000,000,000. The previous maximum yearly expenditure has never exceeded $200,000,000.

This recognition of the need for adequate highways by the national, state and county legislatures is regarded by leaders in the motor truck industry as indicative of the acceptance of highway transportation on a par with the railroads.

"It does not mean, however, that the good-roads problem has been solved," said R. E. Fulton, vice-president of the International Motor Co., in a recent interview. "The problem merely assumes a different aspect.

"Although the American people are demanding a comprehensive system of highways and are willing to pay the price, the expenditure of this huge appropriation is dependent upon three things: first, the supply of highway construction materials; second, the ability of the railroads to furnish enough cars to transport this material; and, third, the ability of engineers and contractors, with the required labor, to handle the construction. These three factors, under present conditions, are direct limitations on the anticipated highway program.

"A shortage of road materials will be sure to develop as the 1920 construction is put under way. It is estimated that the average cost of our roads for next year will be about $20,000 a mile. Allowing but 400 tons of materials per mile, road construction will need not less than 120,000,000 tons of materials, a figure far above the supply now available. The railroads at present are seriously overburdened with freight and are unable to handle even the present amount of traffic. The demands upon engineers, contractors and labor already exceed their capacity. With the amount of money willing to be spent more than tripled and with facilities for spending it less adequate than formerly, it is very doubtful that the program can be carried out unless measures are adopted to overcome these limitations.

"In this connection it is certain that the motor truck will be called on to act as its own benefactor by hauling the material from the source of supply to the construction area, and by taking over short-haul shipments from the railroads, thereby releasing cars for transporting the material over longer distances.

"Highway transportation promoters and good roads enthusiasts have won their point as far as public recognition is concerned, and it only remains for construction facilities to be improved before this country will have a system of highways that will offer unlimited development for motor truck transportation."

Return of Railways With Promised Legislation Vital to Truckmen

Washington, D. C., Jan. 21.—With the return of the railroads to private management a certainty for March 1 and the strong incentive upon congress to enact before that date legislation dealing with the future of the railroads, the extent and character of governmental supervision, etc., there is reason for far-sighted motor truckmen to follow the situation most closely. It is accepted as a foregone conclusion at Washington that the near future will bring a sharp increase in railroad freight rates. In such an increase the average business man is interested merely from one standpoint, namely, the prospective addition to his operating expenses. With the motor truck tradesman, however, there is, in addition to this immediate effect upon overhead in the motor truck business the somewhat more remote but not less significant influence which higher freight rates may exert to induce a more extensive use of motor trucks in highway transport.

Pending agreement between the conferees of the United States Senate and House of Representatives it is idle to speculate upon the terms of the "railroad legislation" that will ultimately be placed on the statute books but forehanded motor truck men will be prompted to scan closely the new legislation in the hope of discerning its future effect upon the "short haul" business of the railroads and the "short line" extension policies of the roads,—features of the railroad practice and policy of the future that will dictate in no small degree the rapidity and the direction of motor truck expansion for intercity and rural hauling. It is likewise to be borne in mind that the impending railroad legislation and the merchant marine legislation that is to follow it on the congressional stage have a very definite relation to all inland waterway navigation interests, including that very considerable number of river and lake steamers that, for the sake of through transportation, connect with motor truck routes.

Truck Maker Calls Attention to Problems Confronting Industry

Orders for motor trucks to-day with the United States Motor Truck Company at its plant at Covington, Kentucky, are from customers whose need of the machines for lines of work which will aid in solving the emergency hauling problems is great. "Industrial conditions of America have developed situations which require immediate attention on the part of motor truck makers," said R. S. Stewart, vice-president of the company. "It is a situation which requires our every attention and that of every other motor truck manufacturer. It is a situation which, in reality, makes the manufacture of motor trucks to-day one of the most interesting problems in American manufacturing. Motor trucks are required for so many lines of work that are in reality quite as important now as during the time of the great war. Rehabilitating the country, getting business back to normal, is work in which the motor truck enters more largely than might be thought even from the statements which have been so freely made in the past. Motor trucks are essential to the work in hand and some day, not very far off, credit is going to be given in full measure to the motor truck and its makers for the great assistance given in these trying times."

Reign of High Prices Not to End Until World Stocks Are Replaced

"The signing of the peace treaty, which we hope in some correct form will be accomplished during the next thirty days, will have a very beneficial effect upon the social conditions in America as well as the rest of the world," declares Christian Girl, president, Standard Parts Company. "In our opinion, labor will be more constant and will accomplish more in the year 1920 than in 1919.

"That prices will fall to any marked degree is not to be expected for a number of reasons. All material produce is based upon the work of the hand and the brain, and the price of materials can only be lowered when there is less demand for the labor of the hand and brain than there is at this moment.

"It will take some years to restock the warehouses of the world, and until this occurs there can be no such thing as overproduction. There may be some unbalanced production, but no surplus of commodities in the average. All our debts have been contracted with a rising and inflated market and can not be paid with a deflated market. This is another reason for the general prices of materials remaining up. Demand for goods will exceed the supply."

Seeks Franchise for $1,000,000 Motor 'Bus Line in Philadelphia

Approval of a motor 'bus line on Broad Street and the Parkway, charging a five-cent fare, has been asked of the Public Service Commission of Philadelphia by Russell Thayer, representing a number of Philadelphians ready to put $1,000,000 into the project.

It is proposed to make the municipality a partner in the enterprise by giving to the city one-half of the common stock of the corporation to be formed and by agreement to turn over to the city without charge all property of the corporation at the expiration of a twenty-year franchise.

The Montana Automobile Distributers' Association will hold its fifth annual automobile show March 15-20, 1920, at Great Falls, Montana.

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Dealers Demand Greater Production

New York Motor Truck Show Reveals Growing Market for Power Wagons That Will Test Manufacturers' Capacity During Coming Year

NOT only will motor trucks span the gulf between increased production and an inefficient national railroad system during the year that lies ahead, but they will also take a most conspicuous part in the fight to bring the price of necessities down to the level of the poor man. These two facts—facts of the most profound importance to both the business man and the bread winner—were proved by the New York Motor Truck Show. When the history of America's automotive industry is written, the year of 1920 will be considered as the period during which motor truck manufacturers faced their most severe test.

Dealers were unanimous in agreeing that, during the next two years, the motor truck manufacturers must increase their production to the maximum so that American industry will not be held down to 75 per centum of its capacity because the railroads and the few inland steamship companies lack necessary facilities to handle an unprecedented quantity of business. As a result of points brought out by the motor truck show, the tremendous demand for motor trucks of every size and the urgent requests for immediate delivery, the manufacturers have returned home determined to expand to the utmost in order to meet a situation seldom, if ever, presented to any industry.

Without a doubt the end of 1920 will see a million and a quarter motor trucks in operation in the United States, according to G. A. Kissel, president of the Kissel Motor Car Company. Mr. Kissel bases his prediction on the fact that the motor truck has solved an extraordinary number of transportation problems, and that it is destined to solve many more before the nation's railways are supplied with the vast amount of new equipment they badly need.

"In a total of over 7,000,000 automobiles and motor trucks in use," Mr. Kissel said, "it is estimated that approximately 800,000 are motor trucks, a number entirely insufficient for industrial transportation requirements. Without a doubt, the end of this year will see over 1,250,000 motor trucks in operation in the United States.

"THERE hasn't been an industrial crisis affecting the nation's transportation equipment in the past three years that the motor truck was not called upon to relieve. The year before the war when general production was trebled, the railroad equipment was unequal to it. The motor truck handled the increase. Since the war the country has been called upon for still greater efforts in production. The motor truck carried the burden when the railroads were pretty well used up. During the last year and a half the many industrial emergencies, strikes that have either closed up transportation or curtailed it altogether, the motor truck again helped manufacturers, producers, wholesale and retail merchants to keep goods coming and going at a normal rate.

"Business concerns, always on the lookout for time- and labor-saving equipment, have been impressed with the economy and adaptability of the motor truck to the extent that it has become part of their business equipment. To-day it is recognized as a carrier that fits individual transportation as no other unit possibly can.

"While formerly concentrated around the big centers, to-day we find factories and industries extending clear across the country, necessitating a transportation system at shipping centers from which the railroads radiate. This situation alone has absorbed thousands of motor trucks and will absorb thousands more. Industrial records show that every day sees the formation of new corporations and institutions. New factory buildings are springing up. The motor truck is not only called on to help in this expansion, but to enable the results of this expansion to do business efficiently and economically.

THE government is about to turn the railroads back to private ownership. It will possibly be years before these systems can get back to the point where necessary new equipment is in operation, and meantime the motor truck will become so interwoven into the activities of industrial concerns that their continual usage will be always necessary.

"During the last year certain lines of business have expanded more than others, foremost being good roads and building contractors. Never has the country seen activities in new buildings which call for billions of dollars. During the next two years these activities must accomplish the results of five normal years.

"Good roads bond issues total over a billion dollars. Thousands of motor trucks will be needed for this line of work. Municipal improvements in virtually every metropolitan district are now waiting for the right kind of weather to start operations.

"In agricultural America the demand for motor trucks has already set in. Within the last year the utility of the farm power wagon has increased a thousandfold. Not only are products and produce transported economically, but cattle, hogs and other live stock are likewise transported.

"I could add scores of other activities that mean increased usage of the motor truck. It is upon these increases that production plans for the motor truck manufacturers are based. I predict that within three years there will be nearly as many motor trucks in this country as there are automobiles at the present time."

In his statement Mr. Kissel reflected the views of virtually every one of the sixty-nine motor truck manufacturers who had exhibits at the show. The spirit of optimism dominated the entire week of the display and every day saw record attendance. Rain made the week anything but pleasant and the Eighth Coast Artillery Armory, in which the show was held, is situated at the extreme limits of Manhattan. But neither of these handicaps prevented unusual interest. And the bulk of the visitors went to the show to do business. There were spectators, of course, but the crowds were composed largely of manufacturers and business men who wanted motor trucks, and wanted them quickly.

THE Eighth Regiment Armory is the largest in the United States, affording, on one floor, 180,000 square feet of unobstructed exhibition space. Besides the sixty-nine different makes of motor trucks shown, there were seventy kinds of accessories on exhibition. When these facts are taken into consideration, the predictions of Mr. Kissel seem almost too small. Mr. Kissel, however, was not the only person to discuss the future of the motor truck industry and its relations to other American industries.

With the unprecedented high price of necessities occupying the attention of every thinking person, the motor truck manufacturers clearly demonstrated that it is the motor truck that must play a most important role in cutting prices down to a normal level. And in their statements they were heartily supported by government representatives. There are five outstanding reasons why this is true, which the manufacturers explained as follows:

1. Fruit, vegetables, milk and eggs arrive in the markets fresh and desirable on the day they leave the farm and expensive freight or express charges are cut in half by the use of motor trucks.
2. The number of handlings is reduced from six or more to only two.
3. The breakage of crates, damage to goods and loss by theft are reduced to almost nothing.
4. Small shipments that could not be hauled to market profitably by the producer can be sent by motor express, thereby increasing the quantity as received in the city and adding to the farmers' income.
5. Motor trucks stop at the farmer's gate to pick up freight, thus saving a drive to a railroad station.

C. W. Reid, formerly of the Highway Transport Division of the Council of National Defense, during an address before the Highway Transport Conference cited an instance where it was proved by experience that a more general use of motor trucks for the transportation of foodstuffs from the farms to the markets would force prices down by at least one-third.

"The Postoffice Department inaugurated a motor parcels post route between Washington and the eastern shore of Maryland," he said. "The eastern shore is one of the most productive trucking sections of the eastern United States. This motorized rural parcels post route had in operation a

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number of motor trucks which made daily visits to and from the national capital. Large quantities of potatoes were ordered by residents of Washington and, delivered at the door, and including postage and everything, the total cost was from $1.15 to $1.25 a bushel. Potatoes coming into Washington from the same sections, after being sent by rail and passing through half a dozen hands, and after as many profits were added, cost the householders from $2.25 to $2.50. Eventually, the Postoffice Department turned the route over to a private firm because the government is not permitted to engage in competition with privately owned corporations. The experiment proved how effectively the motor truck can cut living costs. I might add that many families in Washington are today receiving potatoes at a much reduced price because the privately owned route is still carrying their goods."

Similar comparisons were made by James L. Geddes, chairman of the Rural Motor Express Committee of the National Automobile Chamber of Commerce. The rural motor truck express, he declared, has proved its practicability even under the most trying circumstances.

"THE shipping of potatoes," he continued, "between two towns in Iowa illustrates one way in which a saving was effected. The farmers around St. Ansgar raised potatoes which they sold for 90 cents a bushel to buyers who shipped them by rail to large cities, where they were reshipped to other points.

"At Mason City, twenty-five miles from St. Ansgar, but not on the same railroad, people were paying $1.75 a bushel for potatoes shipped from a point 300 miles away. A rural motor express route was started. Among other things it brought in potatoes from St. Ansgar farms, paying the farmers a dollar a bushel for them and reselling them to Mason City consumers for $1.25, instead of $1.75."

Another staunch supporter of the motor truck as a means of reducing living costs was the representative of the Grant Six, which company manufactures motor trucks as well as passenger cars. Speaking anonymously, he declared he had frequently predicted that the last state in the Union to use motor trucks to any extent would be Iowa. Now, however, Iowa has more motor trucks in use than many other communities and there is every indication that farmers in that state will buy more such vehicles this year than ever before.

"The motor truck manufacturers of America," he said, "will supply the missing links in our railroad system. The practicability of the motor truck for short hauls especially is unquestioned. Railroads are bound to have derailments and wrecks of other natures. If a trainload of food is derailed, it takes hours for wrecking crews to get it started again. And in the meantime dozens of other trains filled with commodities are also held up. But if a motor truck breaks down it is simply run to the side of a road, another motor truck comes alongside and takes its burden and does not delay similar shipments behind it."

The mechanical design in motor trucks, according to the general opinion of exhibitors, is satisfactory and the only changes already made or contemplated concern a number of interesting refinements in details. These might be termed mechanical changes, but they are few in number as compared with former years or before the world learned the utility of the motor truck. One of the most important changes the manufacturers are endeavoring to perfect concerns the saving of fuel.

"The shipping of potatoes," he continued, "between two towns in Iowa illustrates one way in which a saving was effected. The farmers around St. Ansgar raised potatoes which they sold for 90 cents a bushel to buyers who shipped them by rail to large cities, where they were reshipped to other points.

"The fuel question is one of the most pressing problems at present," said N. S. Pringle, production engineer for the Autocar Company. "All manufacturers are striving to get every possible ounce of power out of a gallon of fuel. While we do not contemplate any great change in a specific part, we are looking to a different construction of our engines as a whole, which will not only give the owner of a motor truck a greater percentage of fuel power but will also protect different parts and prevent their wearing out as quickly as is the case now.

"Time will see the simplification of automobile and motor truck engines. Certain parts will undoubtedly be eliminated and one device will suffice for three or four, comparatively speaking. These changes will also make it possible to burn a lower grade of fuel and at the same time permit the owner to get the same power expensive fuels give now.

"One of the most noticeable changes in the construction of motor trucks this year will be in the body. There is a disposition to afford drivers greater protection from bad weather. Motor trucks are being used more extensively for longer trips than heretofore. Enclosed seats are favored because the driver may work in any kind of weather without impairing his health.

ALL of the exhibitors at both sections of the National Automobile Show reported record-breaking retail sales, and hundreds of orders were taken.

In point of attendance, the number of exhibitors and the total value of sales during the National Automobile Show of 1920 was hailed by all exhibitors as decidedly the best ever held. The passenger car section and the truck section demonstrated that the automobile industry in the United States has outstripped every other industry in rapid advancement and the manufacturers feel certain that even greater strides will be made in 1920.

Although there are now 530 or more different models of motor trucks on the market, it became evident during the display that several additional models will be required to meet the peculiar needs of industries this year. It is estimated that 38 per centum of the 1920 models will be of 1½- and 2-ton capacity, with the 3½-ton third; the 2½ fourth, and the 5-ton fifth and the 1-ton sixth. The 1½- and 2½-ton chassis have gained over 50 per centum in popularity during the past year and about 300 per centum since 1915.

An added feature of the motor truck show this year was the Motor Transport Conference, which held sessions daily in the Eighth Regiment Armory. While nothing definite in the way of organization was accomplished, the conference was regarded as having achieved some success in bringing to the attention of manufacturers the saving they can make in both time and economy by more widely using motor trucks for intercity transportation. Probably the strongest speaker at the conference was Colonel Brainard Taylor, who asserted that motor transportation is entitled, because of the big part it played in winning the war, and the part it will take in reconstruction, to federal recognition in the form of the appointment of a cabinet member whose duties would be the supervision of automotive developments. Colonel Taylor is associated with Lieut.-Gen. R. L. Bullard in reorganizing the Army's Motor Transport Corps. Both General Bullard and Colonel Taylor declared themselves in favor of coördination of the nation's automotive industries for broader development, not only as a means of improving that industry but also as a preparedness measure. Colonel Taylor pointed out that when the armistice was signed on November 11, 1918, the Motor Transport Corps of the Army was on the verge of breaking down because no effort had been made in the United States to develop the nation's automobile industry along standard lines. If the Motor Transport Corps had failed, the American infantry and artillery, which was then occupying far advanced positions, would have been unable to retreat quickly in the event of a heavy German counter attack.

"WHAT might not be expected in development of our automotive industries," he said, "if they were coördinated through the operation of a National Motor Transport Commission? Why is it not possible to have that supervision exercised by a cabinet member?" In an address later, General Bullard thoroughly supported this stand. It was pointed out that the automotive industries should be brought to a point of efficiency where they could be used for war purposes immediately should another national emergency confront the country, and at the same time be in a position to face gigantic transportations in peace times in the event of a railroad strike.

Charles T. Terry, a noted lawyer, addressed the conference on "Taking an Interest in Legislation." He denied the popular contention that "as the owners of automobiles are practically the only ones who use the roads these days they should be made to pay for them."

"The reverse is true," he declared. "When a motor truck delivers furniture, food or clothing to the door of a person, that person is indirectly using the highways. Why put this public utility on a different basis from the police and fire departments. Are the persons who have need for a policeman or the fire department the only ones who pay for their upkeep? Certainly not. Automobilists have only to recognize their strength, have only to count their numbers, plan their program and understand their rights. Their demands will not then be denied."

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Truck Owner Makes New Transportation Record

15-TON RUSH ORDER IS CARRIED 225 MILES

What is believed to be a new record in motor truck efficiency, considering distance traveled, time taken and size of load, according to information received by the International Motor Company, of New York, was recently made by Lee B. Hawkins, of Moneta, California, who operates a fleet of eight motor trucks.

A seed firm near Los Angeles wanted to ship 15 tons of seed in a particular rush to another town 225 miles away. No freight car was available, so they asked Hawkins if he could make the delivery in two days. He took the consignment, and with two of his Macks, one carrying 10 tons and the other 5, started out for the town of Calexico the next morning. At night a stop was made and the trip resumed at dawn. Calexico was reached in 30 hours after the start.

Arrangements were then made to receive a return load of nearly 15 tons of dried milk at El Centro, 10 miles from Calexico. This was delivered at San Diego, a distance of 100 miles. There 15 tons of fish were loaded on and delivered in Los Angeles, 130 miles more.

Reaching home at Moneta at midnight, one of the motor trucks hooked onto a trailer and the motor truck and trailer delivered 17½ tons of tomatoes by next morning to a cannery 25 miles away. At a town near by, 7½ tons of well casing were taken on and delivered that night at Elsinore, 100 miles away over the mountains.

Compare this performance with what would have been done by railroad transportation. No more remarkable example of motor truck efficiency could be asked for. There have been many instances of unusual performances of motor trucks that have been staged as stunts by dealers or manufacturers, but this is a case where the owner capitalized on the proved utility of his machines. It shows what any other owner can do if he solicits return loads in a persistent manner.

Harry Harmer With Service

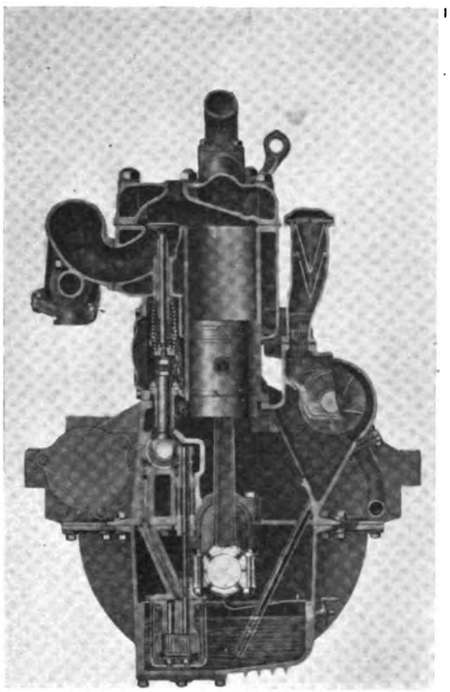
Harry Harmer, for the past seven years connected with the White Company, in charge of its national business, has become identified with the Service Motor Truck Company as Chicago branch manager. Mr. Harmer is known by every man in the automobile business in the city of Chicago, and his standing is of the highest.

Buda Company Places Eight New Engine Models in Production

Among the new engine models for 1920 the Buda Company has placed in production the following eight models: DTU, CTU, FTU, ETU, XTU, YTU, ATU and BTU; all 4-cylinder, with detachable cylinder heads, and with exhaust and intake manifolds cast integral, which features have been used in Buda model HTU for the past three years.

These new engines are of the full forced feed lubricating type. The range of sizes is such that they are grouped in pairs, so that a motor truck manufacturer can use two models with the same mounting dimensions, which will give him one size for solid-tire requirements and a larger and more powerful size for pneumatic-tire requirements.

The entire eight models are uniform throughout and are built *especially for heavy-duty* service. Among some of the



Cross section Buda cylinder.

improvements, attention is called to the water outlet in the cylinder head, which is fitted with a removable elbow, which permits of being placed in four different positions. Water pump and its drive shaft may be removed as a unit or separately.

Farmers Most in Need of Good Road Transportation

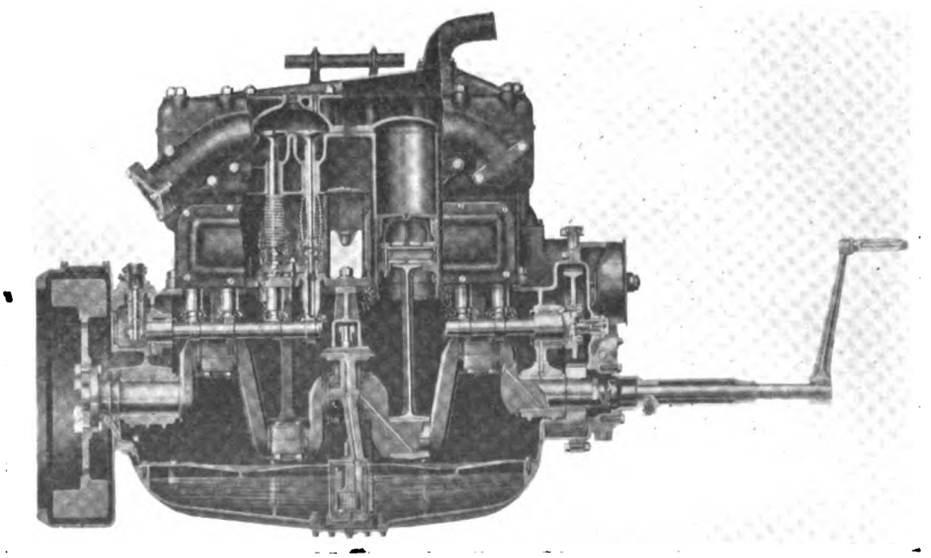
$633,000,000 FOR HIGHWAYS IN 1920

Probably the announcement that the proposed expenditures in the United States for the next year for hard-surfaced highways will be $633,000,000, as compared with the $125,000,000 expenditures of the closing year for the same purposes should mean more to the farmers of this country than nearly any other class. It is a significant fact that nearly 60 per centum of the motor trucks of the United States work in the country, though a large percentage of them may be housed in the city.

"A simple study of these figures will bring home to the residents of the rural communities," declares M. L. Pulcher, vice-president and general manager of the Federal Motor Truck Company, Detroit, Mich., "the tremendous advantage that will accrue to them through the large appropriation for new roads the next year.

"Thirty per centum of the people for whom 60 per centum of the motor trucks of this country work will certainly receive their share of new highways. It means that their 60 per centum of the motor trucks will have just that many more and better road facilities for the transportation of the goods they are accustomed to transport.. But it means even more than that. It means that more roadways, the forerunner of the motor truck and civilization, will enable them to use the motor trucks for transporting an even greater variety of commodities, with a consequent saving of money and time. The possibilities of the motor truck for carrying commodities between farms and cities have only been touched. The newer and better roads will give the impetus needed to bring out all its possibilities."

The intake and exhaust pipe cast as one insure the best results from low-grade fuels. The crankcase may be removed without disturbing the flywheel housing.



Sectional view showing Buda forced oil feed

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Trucks Replace Freight Cars

Power Wagons Have Solved the Problem of More Speedy Traffic in Country's Most Congested Yards

FREIGHT moves through the railroad yards of Cincinnati today in a stream as placid as the old Ohio that meanders by the city's doorsteps. There is no congestion; to look for the maddening delays that are accepted elsewhere as a matter of course, is to look in vain. Cincinnati, with respect to freight, is a city into which shipments are received, and through which shipments pass with less waste of time than anywhere else in the United States.

The motor truck has brought about the transformation. It has made possible a system or interroad transfers that has replaced the freight car, and is in the way of becoming standard for every city in the union.

Not so long ago but what the memory of it is still green in the minds of railroad men, Cincinnati was a city which traffic managers preferred to avoid. It was like a clot in the main railroad arteries to the south and southwest. Freight moved through it sluggishly. If a miscellaneous shipment came in from the east over the Pennsylvania line, it was likely to be held up a week in Cincinnati. The transfer of part-car consignments from one road to another was an aggravatingly tedious proceeding.

The progress of part-car freight was about like this: The freight would be unloaded at the Pennsylvania station. This was one operation. Then it waited at the depot until a "trap" car was ready for it. The loading of this "trap" car—which is simply a freight car used for transferring freight from one railroad terminal to another—was second operation. After it got under way, the "trap" car was usually shunted about the yards for three or four days. If it was bound for the Baltimore & Ohio depot, or the Big Four, it arrived in the due course of time, and was unloaded. This was a third handling. Lastly, the shipment would be transferred from the platform to another car and sent on its final way.

It was this state of affairs—cumbersome and costly for the railroads, and irritating for the shipper—that led to the discovery of a new duty for the motor truck, and the organization of the Cincinnati Motor Terminals Company. Cincinnati was selected for experiments in preference to other cities because its condition of congestion was most acute.

B. F. FITCH, a former railroad man, asked himself this question: "Why wouldn't it be reasonable to make motor trucks take the place of trap cars?" And Yankee like, having asked himself the question he proceeded to answer it.

That was four years ago. Two White motor trucks were put on duty carrying freight between stations. But instead of backing a motor truck up to the loading platform and leaving it there to be filled, the Cincinnati man devised a system of detachable bodies. These bodies are lifted off the motor trucks by means of an overhead traveling crane, which engages four rings with the hooks with which the bodies are provided. The crane is operated by a motor.

When a motor truck rolls up to the station with a load of freight, the whole body is lifted off the chassis, another loaded body is lowered on to the chassis and the motor truck spins away—the whole operation taking but a few minutes. One body is left to be unloaded—the other is carried to another station.

The original two White machines have now been increased to fifteen, while in all, 200 bodies are in use at the various railroad freight depots.

The bodies were designed to carry 4½ tons, but loads much heavier, sometimes amounting to 19,000 pounds, are carried frequently.

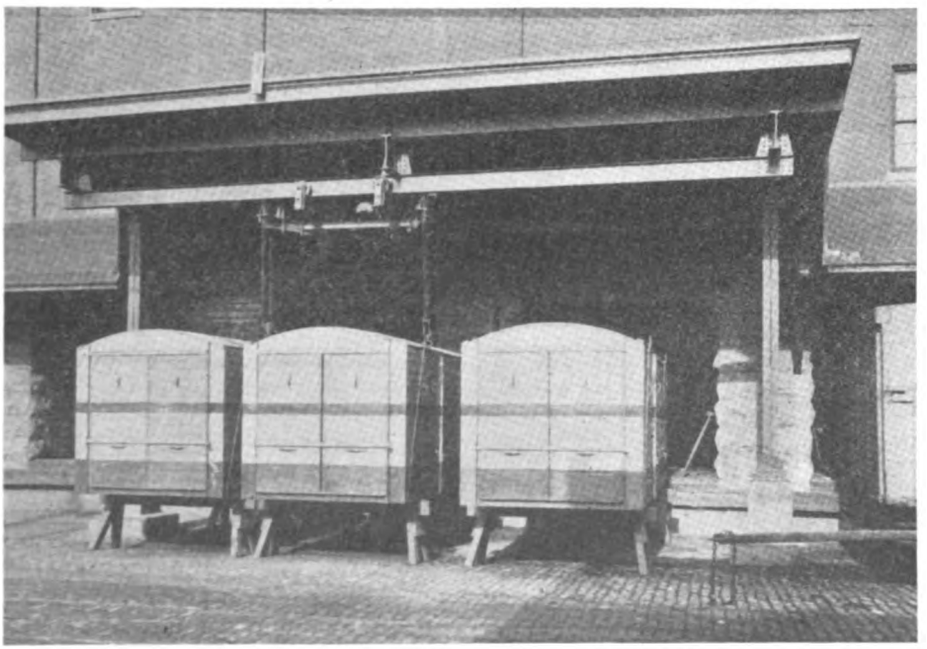
A typical example will show how the system works. If a car filled with miscellaneous consignments from Detroit arrives now at the Baltimore & Ohio station, that part of it which must be transferred direct to the Pennsylvania station is loaded into a Pennsylvania station body; that which is destined for the Big Four is transferred direct to a Big Four body. When the bodies are filled, the doors are sealed by railroad employes; the motor trucks drive up, the bodies are lowered onto them and the transferred freight is carried direct to the other railroads. There are but two handlings of the freight, where before there were four. The whole operation takes at most but a few hours, where previously the transfer of part-car shipments of freight from one station to another required three days, four days, or a week.

THE movement of motor trucks in the Motor Terminal's fleet is directed from the main office of the company much as a train dispatcher directs the movement of trains. When a body is ready, the motor truck's dispatcher is notified, and a machine is sent to the depot needing it. There are no definite schedules, except that it is usually arranged to have bodies ready for moving at 8 o'clock every morning at every station.

An interesting feature about the motor trucks themselves is that all of them are equipped with Dayton steel wheels—standard on White motor trucks. In such work as the machines of the Cincinnati Terminal Company are called upon to perform, the natural supposition would be that tire costs must be high—yet in every instance more than the guaranteed mileage has been secured. This additional mileage is attributed in part to the true roundness and complete stability of the motor trucks' wheels.

But the big thing that has been accomplished in Cincinnati has been the replacement of freight cars with motor trucks, vast relief for the congested Cincinnati terminals, and some quite impressive economies.

It has been computed that the system saves over 300,000 switch-cut movements a year—or approximately 1,000 switch cuts every working day. It is officially given out also that 80 freight cars daily are re-



Special freight bodies placed for loading.

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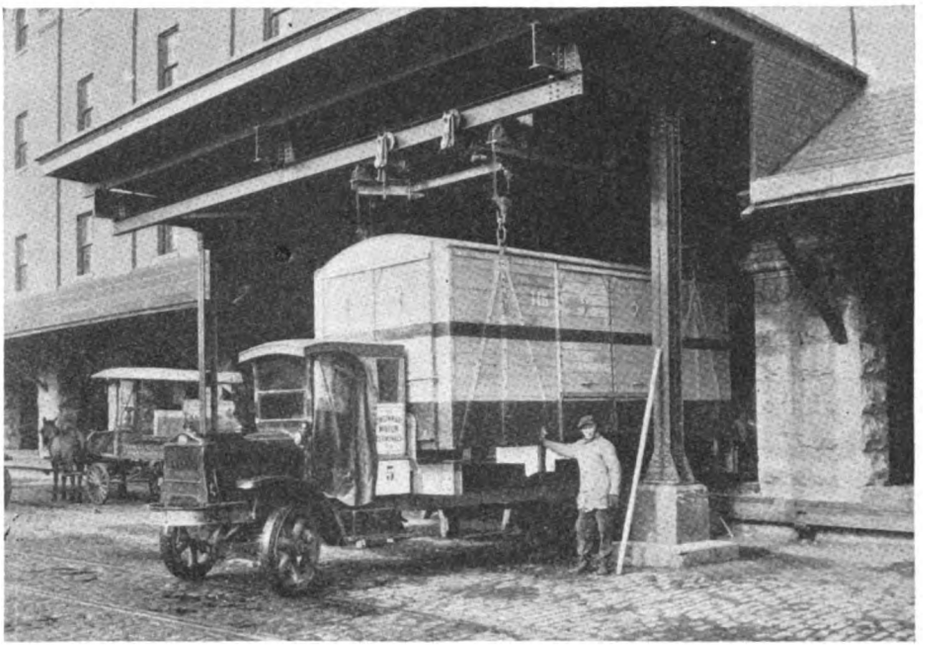
leased for main line traffic that otherwise would have to remain tied up in the freight yards for duty as trap cars. As a freight car is said to be worth from $60 to $90 a day, the saving to the railroads particularly is immense. As mentioned above, the time for transferring freight has also been vastly reduced—under the old system the transfer time per ton-mile was *12 hours* and *18 minutes;* under the motor terminal's system the time per ton-mile is just *two* and *eighteen hundredth minutes.* The United States Railroad Administration has also stated officially that in addition to the time saved, there is also a saving of fifty cents a ton-mile over and above the collateral savings on cars and switchings.

Under current conditions, the total freight transfers in Cincinnati amount to about 1,100 tons a day. Of this the Cincinnati Terminals Company is handling 600 tons, at a ton-rate of 80 cents—the railroads furnishing all the labor for loading and unloading. The Terminals company expects in the course of a few months to handle all the full volume of the transfer business. Its investment in equipment, time and experiments is placed at about $600,000. Later it is proposed to extend the system to every city in the country where freight transfer service is required on a sufficient scale to warrant it.

Quite naturally, since practically the entire system is the result of inventions and original thinking by Mr. Fitch, it has been patented. The method of handling freight, together with the special body, and the unloading and loading devices, have been covered by five basic patents which contain more than 450 specifications.



Method of placing loaded body.

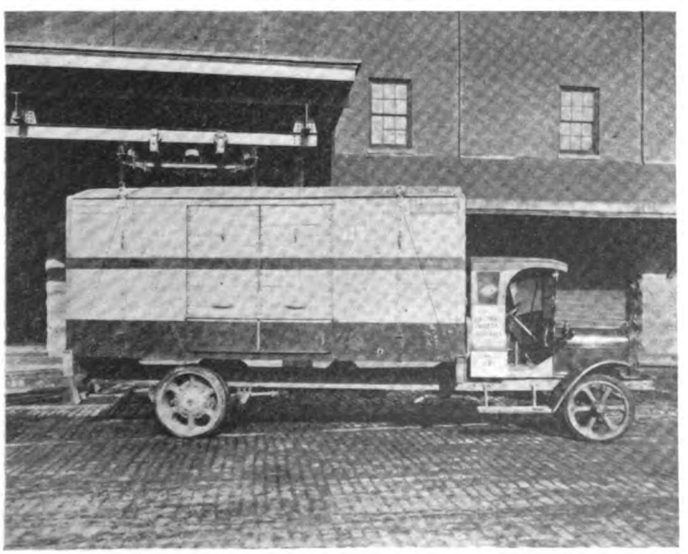
Army Motor Truck Reserve Figures in Danger of Congressional Pruning

Washington, D. C., Jan. 23.—The stubborn insistence of congress that the officials at the War Department shall not realize their dream of an army of 500,000 men is likely to make necessary a sharp revision of the plans that have heretofore obtained for a motor truck reserve. Disillusionment on this score is, indeed, said to be mainly responsible for the recent disposition at the War Department to release for sale in the commercial market an additional supply of motor trucks that have been in service or in storage in the United States.

In this connection it may be interesting to the trade to have a peep at the detailed requisition of the motor trucks which the War Department had decided would be necessary to outfit the contemplated army of half a million men. The complement was to include the following: ¾-ton ambulances, 1,661; ¾-ton cargo trucks, 2,250; ¾-ton machine trucks, 1,179; ¾-ton reconnaissance trucks, 363; ¾-tank, gas and water trucks, 180; 26 special searchlight trucks; 2,556 cargo trucks of 1½- and 2-ton capacity; 190 special body trucks of this capacity; 7,597 cargo trucks of the 3- to 5-ton class; 288 artillery repair trucks; 717 artillery supply trucks; 76 equipment repair trucks; 373 machine shop trucks; 538 tank trucks; 381 special body trucks; and 13 searchlight trucks, all of the immediate foregoing being of the 3- to 5-ton capacity. Supplementing this array there had been listed of F. W. D. cargo trucks 1,762 trucks, 443 four-wheeled tractors and 3,854 trailers in assorted sizes. The figures given are supposed to represent actual net requirements. It was the desire of the officials of the War Department to have on hand at all times a 10 per centum reserve on top of the listed quota of each class and type of motor truck.

U. S. Increases Capital

At the stockholders' meeting of the United States Motor Truck Company, of Cincinnati, Ohio, held on January 14, the stock was increased from $1,000,000 to $2,500,000 and over subscribed by the present stockholders. This company was taken over by its present managers in 1914 and capitalized for $300,000. In 1917, on account of the rapid growth, it was found necessary to increase the capital to $1,000,000, and on account of the continuous growth it was decided at the meeting on the 14th to increase it to $2,500,000.



Complete terminal equipment.

Chassis equipped for special body.

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Advocates Fire Equipment For Townships

Indiana First State to Take Up Legislation to Protect Property from Fire in County Districts

MOTOR truck dealers and manufacturers should take an active interest in fire prevention work, according to Ralph E. Richman, of Cincinnati, Ohio, editor of *Fire Protection*. Business at large, Mr. Richman asserts, is coming to the realization that the fire waste of the country can be and must be minimized. Motor truck men have an additional interest, because of the fact that many states are considering laws authorizing townships to purchase and maintain fire engines.

Indiana, for instance, passed such a law at its last legislative meeting, only a kink in the statutes preventing it from becoming effective. The measure failed to reach the governor in the specified time and therefore did not become a law. However, it will come up again at the next meeting of the legislature, and will not be opposed. Motor truck interests should take an active part in presenting such legislation in other states. They will have the active support of farming communities, Mr. Richman insists.

Farm communities now have the same protection that many cities had fifteen years ago, Mr. Richman said, in reciting the improvement in fire fighting wrought by motor vehicles. In other words, in the time formerly required for a horse-drawn engine to reach its farthest point in the city, a motor-drawn piece of apparatus can get far into the country. The difficulty lies in the fact that many cities will not permit their departments to make out-of-town runs. Hence the necessity for townships having their own fire-fighting equipment or farmers combining to this end.

Apropos of this phase, Mr. Richman tells of one community where the farmers banded together to purchase a motor-driven fire engine, located at a central point. The mail boxes in that section were numbered just as fire alarms are in large cities. In case of fire, the farmer telephoned headquarters, merely giving the number. A chart at headquarters instantly showed the location of the fire.

"If I were forced to choose between fire insurance on my automobile and a fire extinguisher," said Mr. Richman, "I should seriously consider the latter. The chemical extinguisher is capable of putting out the big majority of fires in automobiles and motor trucks. Automobile men should preach this gospel. The owner of a machine which burns may invest in a new one. Then again he may invest in a new with this experience that he will become prejudiced against the passenger car or motor truck and decide to get along without it. Even selfish interests of automobile men point to an aggressive attitude in the way of fire prevention."

Farmers could do wonderful work, he said, if each of them had a chemical extinguisher attached to his automobile or motor truck. A fire quickly attracts a large number of farmers, who make their way to the scene of the blaze in their own cars. If twenty of them were armed with extinguishers, the combined force would be equal to that of a modern engine, according to the exponent of fire prevention.

Motor truck and automobile men should point out these facts to the farmer, he asserts. The dealer who is able to band agriculturists together in this way has served both the interests of the country, his clients and himself.

Good roads are no less important in fire fighting than in other phases of the motor truck business. If townships do purchase engines, their work will be hampered by bad roads. In fact, Mr. Richman has records of several big rural losses caused through the delay of the fire-fighting equipment in reaching the scene because of poor highways.

"Good roads are essential to development of protective devices in rural communities just as much as they are necessary for the prosperity of motor truck dealers. The good roads question is bigger than we realize. Much has been said on the subject, yet no one has yet plumbed the depths. Motor truck men will find that the question of fire prevention is one that, like the development of the motor truck, will be answered as the highways of the country are improved."

300,000 Freight Cars Carry Record Motor Wagon Output for 1919

Shipping figures have grown steadily—a tabulation covering a period since January, 1914, indicating that the traffic in motor vehicles for that year had attained a volume of 130,114 carloads. In 1915, 192,575 carloads were shipped; 1916, 271,174 carloads; 1917, 269,542. During the year 1918 the effect of makers turning their plants over to war purposes is shown from the fact that shipments dropped to 161,470 carloads in that year. By March, 1919, however, automobile plants were rapidly getting back into normal production and the records indicate that shipping in that year amounted to 300,000 carloads. October shows the highest point of production reached by the industry in any one month —29,742 carloads were shipped by rail, in addition to which the more congested district in the Middle West drove overland 12,508 machines from the factories and 3,753 were shipped by boat on the Great Lakes.

Motor Trucks Feeding Big Plants Since Railways Prove Inadequate

Many persons wonder how motor car manufacturers continue to obtain parts and necessary equipment practically whenever they need it. Inasmuch as the railroads are congested and traffic almost at a standstill, it becomes even more of a problem. This has been solved with the success so far obtained by the "ship by truck" system.

The Inter-City Trucking Service, 18 Baker street, is at present operating a fleet of trucks between Detroit and Flint and Detroit and Pontiac for different manufacturers. The system is worked this way: their service is contracted for, the motor car manufacturers purchase all their necessities and have them shipped to the Inter-City warehouse during the day. At night the Inter-City operates the trucks. Supplies which were in Detroit one day are ready for use at the factories the next morning.

On the return trip the trucks bring in drugs, dry-goods and sundry supplies to Detroit. This service has been in operation for 15 months. The company is carrying between 50 and 60 tons each night.

Louisville Dealers Have Successful Year With Large Sales Increase

The past year has shown a big increase in the number of motor trucks operating in Louisville and throughout the state, along with a great many new agencies, several changes, and much better service stations, garages, etc. The year as a whole has been a good one with the motor truck handlers in this vicinity. Sales of such motor trucks as the Republic, Service, Packard, White, Federal, Pierce-Arrow were good, while many other motor trucks made good showings.

One of the most interesting announcements of several months in Louisville is in connection with the organization of the Packard-Louisville Company, composed of Arthur Middleton and Craig Culbertson, who have taken over the Packard motor truck and passenger car agencies, from the Southern Motors Company, which has controlled Packard sales in Louisville for several years. The Packard-Louisville Company has taken over the big mechanical shops of the Southern Motors at Eighteenth and Walnut Streets, and is planning a big new garage, machine shop and salesroom on Broadway. The new company has Louisville, Lexington, Evansville and adjacent territory.

Newark Show February 28

Newark, Jan. 17.—From the manner in which automobile dealers and accessory firms are applying for space in the annual Newark Automobile Show, to be held in the First Regiment Armory, February 28 to March 6, it will surpass all previous records. Manager Claude E. Holgate has announced that from indications there will not be sufficient show space to accommodate all the demands.

A Correction

Through error, E. A. Haskins, author of the article in January POWER WAGON, entitled "Relationships in Truck Selling," was credited with being service manager of the Republic Motor Truck Company. Mr. Haskins was formerly service manager of the Federal Motor Truck Company.

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Lincoln Highway Record to 1920

Gigantic Strides Made Toward Completion of America's First Transcontinental Road Reflect Nation's General Road-Building Progress; Route Nears Last Goal

ALL America is interested in the Lincoln Highway. This great road, laid out and proclaimed as a memorial to Lincoln by the Lincoln Highway Association in 1913 as the first great highway of national importance, has come to be looked upon as America's "Object Lesson Road." It has come to be, through the commanding importance of its strategic location, the main line or backbone of a gradually developing national system of highways.

Every American interested in the great constructive accomplishments of the nation will be interested to learn that the year 1919, following so closely upon the heels of war, witnessed the greatest constructive development on the Lincoln Highway ever accomplished in a single year. As the United States Office of Public Roads has announced, every organization in the country having any part in highway improvement can feel a large measure of satisfaction in the fact that road-building was the one big public activity which got under way promptly following the war, which opened a large field for unemployed labor and which offered a market for construction material. The war gave a tremendous impetus to American highway construction as its lessons had a highly beneficial effect upon public opinion, with the result that there was almost a universal demand for proper permanent highway improvement in every part of the country as soon as the war ended. Moreover, during 1917 highway construction in every part of the country was greatly curtailed and came almost to a stop in 1918, with a result that road conditions had become very bad even on the most important main highways in every section of the country, while highway funds had continued to pile up in the treasuries of the various counties and states and were available for the undertaking of great construction projects early in 1919. In many states large bond issues for highway construction had been passed during the war with the provision that the bonds should be sold and the work started after the war.

As a result of all conditions 1919 will doubtless be looked upon as the real start of what will later probably be considered as the era of American highway building. While it can not be said that 1919 marked the climax of Lincoln Highway activity, in view of the fact that plans for 1920 indicate even greater accomplishments, nevertheless, the year's developments along the route are an excellent barometer of the highway situation in this country generally. The actual improvement accomplished on the Lincoln Highway in 1919 bid fair to equal the combined work of the previous five years during which the Lincoln Highway Association was actively promoting the construction of the route.

THE Lincoln Highway Association's headquarters has just completed a careful compilation of the expenditures made by the various states and counties through which the Lincoln Highway passes upon its improvement during the past year. The Lincoln Highway, which was at first largely a series of connecting county roads, has gradually become through official action of the various states an integral portion of the several state highway systems, with the result that the tabulation of expenditures provided direct to the association by the state highway departments of the eleven states traversed very accurately indicates not only amounts expended, but the mileage of improvement accomplished. In the majority of states federal aid has largely augmented the state and county funds, the route having been established as a federal aid road to be improved directly under the inspection of the government for more than three-quarters of its total distance between New York and San Francisco.

In the following table prepared by the Lincoln Highway Association showing the expenditures on the Lincoln Highway in each state traversed, the amount of federal and state aid accurately reported through the highway departments is augmented by such scattered county reports as were available. In nearly every state, however, the expenditures were larger than the actual detailed figures reported.

Expenditures on the Lincoln Highway, 1919—New Construction, Reconstruction and Maintenance.

New Jersey	$1,383,572.00
Pennsylvania	1,418,169.28
Ohio	1,903,708.10
Indiana	742,218.30
Illinois	1,430,120.28
Iowa	256,899.29
Nebraska	613,025.00
Wyoming	127,009.94
Utah	225,528.54
Nevada	411,049.58
California	375,500.00
Total	$8,886,800.31

To the above must be added much of the county construction and maintenance work and city paving for which it is impossible to get accurate detailed figures. Conservative estimates resulting from actual inspection of such work in progress indicates that these unreported expenditures amounted to over $500,000.00 in 1919.

Total Financing for Lincoln Way improvement, 1919.

Detailed expenditures reported	$ 8,886,800.31
Unreported improvement work	500,000.00
Funds provided for contracts let	2,323,112.59
	$11,709,912.90

To give significance to the meaning of the above figures as showing the tremendous impetus given Lincoln Way improvement during the past year, the association presents the following table indicating the amounts expended for Lincoln Highway construction and maintenance during each year since the association actively undertook its work.

Yearly Expenditures on the Lincoln Highway.

1914	$1,200,000.00
1915	2,580,280.00
1916	4,198,165.00
1917*	2,500,918.96
1918*	2,996,307.77
1919	9,386,800.31
Total expenditures on Lincoln Highway in six years	$22,362,472.04

*War

It is interesting to note that the total

Section of brick paving on Lincoln Way in Indiana.

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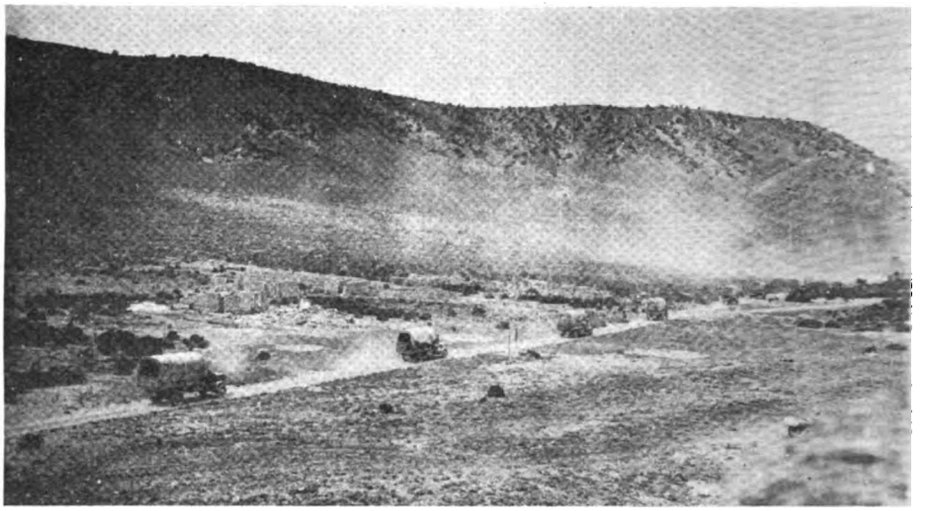
amount spent for improvement by all of the states crossed by the road between the two coasts in 1914 was less than the amount spent on the work in four separate states during the past year. The association also points out that contracts covering a total of 159.8 miles of permanent improvement were let in 1919 in seven of the states traversed by the route, the total amount of these contracts aggregating an additional $2,323,112.59—money already provided and in addition to that actually expended for work completed in 1919. It will thus be seen that total financing for Lincoln Highway improvement during the past year has amounted to close to $12,000,000, only about a million short of the total actual expenditures for the five years 1913 through 1918.

WHILE construction costs are interesting as reflecting the increasing demand for proper permanent improvement and a correspondingly increased willingness to liberally provide the necessary money for the work, the tourist or traveler or those interested in highway freight transportation, will be more concerned with the constructive results accomplished through these expenditures. The Lincoln Highway Association points out as significant the increasing proportion of the total expenditures which are permanently invested in standard types of construction designed to meet the traffic of the future. In addition to the considerable cost of properly maintaining such a heavily traveled road as the Lincoln Highway, 377.33 miles of new permanent work was accomplished on the Lincoln Highway during 1919. This new mileage was of the following types:

Concrete	121.14
Brick	21.28
Bit. macadam	17.61
Macadam	28.75
Gravel	69.25
Shale	2.
Permanent earth grade	117.3
Total	377.33

The concrete and brick improvement put in on the Lincoln Highway during the past year was largely in the eastern states and in California, where the tremendous traffic carried by the route and the vast sums available for highway construction combined to make the highest type of work necessary and possible. The 19 miles of new highway completed in New Jersey were all of the highest type of concrete construction. This section of the Lincoln Highway between Philadelphia and New York carries not only the heaviest traffic of any section of the transcontinental road, but also what is said to be the heaviest traffic on any road in America. As an instance of this density of traffic, a careful census made on the bridge over the Passaic River west of Jersey City last spring by county officials showed the passage of 11,000 vehicles in a period of fifteen hours. Small wonder that the old macadam which constituted the Lincoln Highway in New Jersey went rapidly to pieces. The Pennsylvania section of the Lincoln Highway comprising the main traveled road between Pittsburgh and Philadelphia and other eastern points carries a traffic volume almost as heavy as the New Jersey section.



Army train on Lincoln Highway in Nevada.

This famous route through the wonderful scenery of the Alleghenies, constructed for years of the highest grade of macadam, was largely torn to pieces by the tremendous volume of motor truck traffic it carried during the war when it was used as a government transport route. The excessive cost of yearly maintenance work has caused the Pennsylvania State Highway Department to undertake the gradual reconstruction of the entire road of concrete and over 19 miles were completed in 1919.

Ohio took a long step towards the permanent completion of the Lincoln Way in 1919 by completing 56½ miles of new concrete, brick and bituminous macadam. Indiana completed 21 miles of concrete, and Illinois 35. The few remaining gaps of unimprovement on the Lincoln Way in these states will be taken care of during 1920, with a result that the end of the year will see a completed permanent all-weather road from Times Square to the Mississippi River, providing the shortest, best and most direct route between New York and Chicago.

Lincoln Highway as seen in Ohio.

WEST of the Mississippi progress toward the ultimate achievement of the Lincoln Highway ideal has been if anything more needed than that accomplished in the East for the reason that during the past year fundamental difficulties have been removed in several states and a safe and open route in line for rapid betterment opened from the Mississippi to San Francisco Bay. With the exception of California, Iowa is the one state west of the Mississippi through which the Lincoln Highway passes which is fully capable of itself financing the adequate and permanent completion of the road. Antiquated legislation which was the main barrier to proper highway improvement in Iowa was superseded by a new law during the past year which will enable the prompt permanent construction of all of the important main line roads, including the Lincoln Way, which was established as one of the state highways.

Something less than 1,000 miles of Lincoln Highway still remains to be properly improved to an adequate standard, but for long sections the improvement has already been financed or is about to be financed, and the construction is but a question of

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the time needed to accomplish the work. The Lincoln Highway has become the best known road in the world and is becoming yearly a more and more adequate memorial to the great man whose name it bears.

Classification of Types of Road Construction on the Lincoln Way, New York to San Francisco, Jan. 1, 1920.

	Miles
Concrete	294.84
Brick	212.58
Bit. macadam	425.61
Macadam	286.65
Asphalt	78.00
Creosote block	5.90
Granite block	7.10
Graded gravel	770.75
Natural gravel	200.00
Shale	17.00
Graded dirt	817.57
Natural dirt	93.70
Sand	13.30
Total	3223.00
"Improved" mileage	2538
"Unimproved" natural road	685

During 1919 Illinois Registered Cars at Rate of One Each Minute

Nineteen hundred and nineteen was the banner year for motor vehicle licenses in Illinois. The permits aggregated 480,000, more than 90,000 more than in the preceding year. The total income for the year aggregated $4,045,560, as against $472,000 less than in 1918. In 1911, Illinois issued 38,000 licenses. In 1912 the number jumped to 68,000; in 1913, the number was 94,000; in 1914, the total increased to 131,000; in 1915, to 180,000; in 1916, to 248,000; and in 1917 the number was 340,000. The income from licenses for 1919 was one-third of the total amount collected since the licenses were first issued nine years ago.

The figures from the secretary of state's office indicated that Illinois purchased automobiles in 1919 at the rate of 200 per day, or one every seven minutes during the final month of the year, when the demand was ordinarily small. For the whole year, the applications averaged 1,315 per day, or one for nearly every minute of the year.

Electric Road Adds Trucks

To extend freight service on interurban lines to small towns near way points, the Toledo & Indiana Railroad has established motor truck service to supplement its electric roads. Officials announce service with Montpeiler, Edon, Edgerton and Milburn is via a motor truck line touching the main road at Bryan. Freight for Montpelier will be taken at 20 cents per 100 pounds and delivered at 8 the next morning. Edon freight, at 25 cents, will arrive at 9:30 a. m. Edgerton freight, at 20 cents, will be delivered at 11 a. m. Milburn, at 20 cents, delivered at 1:30 p. m.

Trucks Save $216,000,000

"It is estimated that 1,200,000,000 tons of goods are hauled yearly by motor trucks at a cost of an average of 15 cents per ton," says J. M. Lynch, director of sales of the Kissel Motor Car Company. "This gives us a total of $118,000,000 for moving the above tonnage. In comparing these figures with the work of wagons and horses, it is found that the cost of maintaining and operating horse teams is 33 cents per ton-mile, which, if correct, gives a saving of $216,000,000 per year in favor of the motor truck."

Transport Engineering Is Added to N. Y. U. Course

F. VAN Z. LANE PROFESSOR IN CHARGE

A course in Motor Transportation Engineering is to be added to the curriculum of New York University, to begin in February, according to an announcement made by Dean Charles H. Snow, of the School of Applied Science. The new study, which is considered a clear indication of the ascending importance of motor truck transportation is to be given by F. Van Z. Lane, chief transportation engineer of the Packard Motor Car Company, Detroit. It will form a part of the new course in Industrial Engineering and will be open to students in Mechanical and Civil Engineering, particularly those specializing in subjects relating to Highway Engineering.

The course will have more to do with the application of the motor truck than the mechanics of it, according to Mr. Lane. "The motor truck is part of the mechanical equipment of every industry, and engineers entering any industry must become more familiar with its application," he says. "The course in motor transportation will deal solely with the application of the motor truck as a transportation unit in industry and is not to be confused with motor truck design.

"It has been proved, under the most trying circumstances, that the motor truck is mechanically dependable and that by applying it correctly it is an economical means of transport and that to get the most efficient service from their equipment those in industry should understand how it can be used with the greatest effectiveness. New York, which is the largest user of motor trucks in the country, is a huge laboratory for this work."

Mr. Lane is a graduate of New York University, which conferred upon him the degree of C. E. for traffic work accomplished—probably the first degree ever awarded for this kind of work. He was an engineer in the Brooklyn Highway Department, was engineer in charge of traffic on the Brooklyn and other East River bridges and later held a similar position in the Department of Public Works, Borough of Manhattan, where he had charge of gathering statistics relative to the widening of a number of important streets. He was the first traffic engineer employed by New York City and laid out some of the most recent routes for the operators of motor 'buses there and in Chicago. He was executive engineer on the Bayonne Marine Terminal and, as engineer to the Chamber of Commerce at Jersey City, was instrumental in promoting the vehicular tunnel now under construction between that city and New York. He has served various city plan commissions, municipalities, civic organizations and industries as transportation engineer and has studied the subject abroad. This course is the first of its kind to be given by any university in connection with industrial study, and will include the following lectures: The Future of the Motor Truck, Motor Truck Operating Costs, Motor Truck *versus* Horses, Motor Trucks *versus* Railroads, Trailers and Semi-Trailers, Special Bodies, Loading and Unloading Devices, Scheduling, Routing and Dispatching, Maintenance and Garaging, Hiring, Training, and Retaining Drivers.

James G. Heaslet, New Signal Head, Is Warmly Welcomed in Industry

From the earliest period of the automobile industry James G. Heaslet has been recognized as one of its leading production and design engineers. But even when he was most deeply engrossed with passenger car work Mr. Heaslet never failed to attentively observe the development of motor truck design, and upon his retirement from the Studebaker Company this interest gathered force and finally culminated in his entrance into the motor truck industry as principal stockholder and president of the Signal Motor Truck Company of Detroit. In his new field Mr. Heaslet, because of his broad factory experience and high capacity, will be welcomed by every section of the industry.

Mr. Heaslet's services to the automotive industry has been of such importance as to merit conspicuous mention. When the Studebaker Corporation controlled the Garford company, those in charge took Mr. Heaslet from Lima to Detroit to act as Studebaker engineer. After being in Detroit about a year, the controlling interests in Studebaker called a meeting to which Mr. Heaslet was invited. The corporation at that time was not enjoying the financial success it is today, and Mr. Heaslet was asked if he could outline a production plan that would turn the tide. Before this he had remarked to an eastern banker, deeply interested in the company, that it was impossible to make a financial success with the plant arrangement as it then stood. To back this statement Mr. Heaslet was forced to take the floor and tell the mistakes of his superiors. Shortly after this little incident he was called to New York, appointed superintendent of production, given $800,000 to carry out his plans, and granted a year in which to make good.

Starting work in September, he rearranged all three of the Studebaker plants, which gigantic task was completed by the following February, the work having been done at nights and not interfering with production. Not one factory machine had been left on its original base. At the end of the first year the pay-roll had been reduced from 12,000 to 6,000 men and production increased from 27,000 to 47,000 cars.

Almost broken in health, Mr. Heaslet quit the Studebaker company and entered the service of the government as district chief of aviation construction. After the war he took a much needed rest in California and is now ready to direct the fortunes of the Signal. Mr. Heaslet declares that he has no revolutionary plans for the Signal design. The company improvements will be gradual. It is his aim to build staunch and reliable transportation units rather than motor trucks—to make machines that will fit the kinds of transportation he thinks has the greatest possibilities.

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A New Factor in Truck Selling

By C. C. FRAME
Transportation Engineer, Service Motor Truck Company

BY the question, "What will it cost to operate your motor trucks in my business?" is usually meant, "To what extent will it be profitable to operate them in my business?" This is indeed the fundamental question. Any consideration short of this will not give the final answer. By stating the question as we do, it is not intended to say that it represents the exact words used by the average motor truck buyer, or that the question may even be uppermost in his mind, at first; but any business man, having need of motor trucks, is vitally interested in having his goods delivered in the most efficient manner at the least expense and trouble to him, and is bound, sooner or later, to lay aside personal attachment and prejudices to invest with the motor truck organization able to sell him the most transportation for his money.

THERE was a time in the history of the industry when the obligations of the factory and dealer were generally considered ended upon the delivery of a new motor truck to its owner. Any person of good repute could, upon application or the purchase of a motor truck, become its authorized representative in his community. His obligations to the public, as then interpreted, did not require that he maintain a place of business, in most instances. This was selling power wagons under the slogan, "May the best truck win." And it seldom did.

The industry was not long in discovering, however, that its obligations to the public were something more than producing a good motor truck for its use. It discovered that it was in business to *serve* a specific need of the public, which its product would not do without extreme vigilance and enterprise upon the part of the manufacturer and dealer, in providing machinery whereby its motor trucks would deliver the continuous economical performance of which they were capable. As a result, we find the most successful manufacturers and dealers to-day are those who have realized their deeper obligations and have built their business around the central idea of *service.* They have been selling *truck performance.*

With this dealer, a good motor truck is necessary, but the best is not essential, in selling superior performance. He is successful because he best serves the whole needs of the public. The machines he sells may be inferior, but the service he renders makes for superior performance. His reputation and that of his motor truck is established in his community. He is sought out and respected by his motor truck buying public. His biggest problem is in procuring sufficient machines to supply the demand. There is no longer much quibbling about price and first costs. He is even very particular to whom he sells. His reward has been in proportion to his ability to serve.

But this is not all. Superior motor truck performance, in itself, does not completely solve the transportation problems of a community as a whole, or the individual. There are certain laws governing the application of motor trucks to the work in hand which are not embraced in motor truck design and maintenance. Until these are taken advantage of to their fullest extent that inquiry of the motor truck buyer, "To what extent will it be profitable to operate your motor trucks in my business?" will not be fully answered. As in the case of a dealer with an inferior machine rendering superior performance, it is entirely possible for the dealer with both an inferior motor tuck and performance to get the business because he enables the owner to obtain more from his motor trucks. He can sell more transportation for the money than the other fellow; he can more fully supply the needs of the purchaser. There are no "ifs" nor "ands" about this matter. The really successful dealer of the future will be that one who is best prepared to solve the hauling problems of his customers. Not all sales, perhaps, will be made on this basis, but that proportion of them which constitute the nicest business.

TO illustrate this point, take the case of a wholesale groceryman. He formerly used horses to deliver his product within the city limits and to transfer it to and from the freight depots. He has since replaced this equipment with motor trucks and is now perfectly satisfied with the machines he has. They give good performance and have saved some money over the horse equipment. You have sold him his equipment and proceed to point to him as one of your satisfied customers. But, along comes a man representing a competitive motor truck. He makes a thorough study and analysis of this wholesaler's transportation requirements. He finds that while the motor trucks now in operation are giving excellent service and are saving money over horse equipment, yet they are standing idle one-half the time. This idle time is divided up partly for unloading the motor truck, partly for loading, and partly for the lack of something to do, etc. He also finds that by some change in the methods and facilities for loading and unloading, this lost time can be considerably reduced, also that by a change of routing one larger motor truck can easily do the work of two smaller ones already in service. He may also find that from his experience the drivers are not getting all the work out of the motor truck they could easily do. Digging deeper, he may find that the radius of territory served by this wholesaler does not exceed fifty miles and that the service he is getting from the railroads is very unsatisfactory.

IN HIS report to this wholesaler he makes recommendations which will reduce the number of city machines required and increase the operating efficiency of the remainder 25 per centum. He also tells this wholesaler that, although his out-of-town business isn't enough, in itself, to warrant the use of motor trucks in this work, yet he (this motor truck representative) has been able to organize a transportation company which will deliver almost all this wholesaler's railroad shipments by motor truck, in a highly satisfactory manner at a cost he can well afford to pay. Whose customer then will this wholesaler be? Will he continue to buy your motor trucks, or those of a competitor who can sell him much more transportation for the money.

Of what, then, in this case, will it avail a factory to produce the best motor truck and maintain a well-stocked service department? It is only through the united effort and coöperation of the factory and dealers that the benefits of this new development in the progress of the motor truck industry can be realized.

Thus the front ranks of the motor truck industry has grown from an irresponsible beginning to a full recognition of their responsibilities to the indidivaul purchaser and the public as a whole. Being manufacturers of highly efficient transportation units, these motor truck companies should be best versed in how to obtain the most good from their product. Possessing this knowledge, it becomes an asset only when made available to the motor truck owning public. Viewed in this light, the motor truck correctly becomes a highly efficient tool, capable of greatly increased production in the hands of expert application.

Fairfield Manufacturing Company Not to Make Ross Steering-Gears

Through the unfortunate wording in a headline in the December issue of POWER WAGON, it was made to appear that the new Fairfield Manufacturing Company, La Fayette, Indiana, was to take over the manufacture of Ross steering-gears. The officers of the new company are all prominent in the Ross Gear & Tool Company. The formation of the Fairfield company is the result of the great growth of the Ross gear business. That part of the Ross factory facilities which have heretofore been devoted to the manufacture of the differential and bevel gears will now be produced by the new organization. POWER WAGON is very glad to make this correction.

The coöperative plan of marketing is meeting with great success in some agricultural districts where the farmer with a motor truck is helping his neighbors to haul their live stock and produce to market.

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John T. Rainier Says New York Show of 1920 the Finest Ever Held

John T. Rainier, president of the Rainier Motor Corporation, says that the 1920 New York Motor Truck Show was the finest ever held in the East. He says that a new spirit seems to permeate the entire automotive industry and that great things are anticipated for the coming year.

"All the motor truck makers are right up on their toes this year," said Mr. Rainier. "I have never seen things move with so much vim and enterprise. And, best of all, every maker is striving to produce a better motor truck than ever before. There never was such a demand for motor trucks all over the world as now. Horses have almost disappeared in our cities—and no one will regret this who loves the horse. The sight of these poor animals struggling to maintain a footing on our icy asphalt is pitiful. It makes the kind-hearted man want to go and force the driver to put his load on a motor truck—and make more money and be far happier.

"We have increased our factory facilities at Flushing, Long Island, to meet the great demand—which has literally overwhelmed so many of our factories. We can and do supply motor trucks as wanted quickly and the demand is excessive from every state in the Union. We can and do turn out more than one hundred motor trucks every week—complete with any sort of body, when desired. And we used to think if we finished up ten or a dozen trucks in a week we were doing well."

Fix Dues at $36

At a recent meeting of the Cincinnati Truck Dealers' Association it was decided to make the dues of active members $36. The dues for associate members will be $12 a year. The constitution presented by the By-laws Committee, composed of L. A. Woodward, Albert Staab and G. S. McDuff, was adopted. The following directors were elected: Charles Ratterman, E. L. Scott, William Kilduff, Harry P. Kelly, L. A. Woodward, A. R. Hoffman and Albert Staab. A. B. Kibby, J. B. Nostheide and Al Herschede are on the Finance Committee. R. H. Faulkner will represent the association on the Cincinnati Good Roads Committee. A. B. Kibby is the chairman of the Membership Committee.

Acme Dealers Meet

The Acme Motor Truck Company, Cadillac, Michigan, held its annual sales conference at the plant December 16 to 18, inclusive. District representatives and distributers from coast to coast were present. Sales plans were gone over and preparations completed for the marketing of a greatly increased output for 1920. A banquet was given the visitors. Acme has just placed a big addition to its assembly plant in operation and its reports show the last year the best in its history.

The Egbert Motor Truck Company, Inc., has been appointed distributer for Signal motor trucks in the Philadelphia territory.

National Highways Would Save War's Cost

By ROY D. CHAPIN

Chairman, Highways Committee, National Automobile Chamber of Commerce

IN A day when every expenditure should be rigidly scrutinized and every effort made to overcome the burden which the world war has saddled upon us, the need of a national highway system stands out more clearly than ever before. Not one item in the domestic budget of the United States gives evidence of such waste and inefficiency as that displayed in our highway transportation costs, which are a direct reflection of the damage wrought by poor roads. Because of this condition, many cents are added to the cost of the daily meal of every citizen in the land, thousands of tons of food still remain rotting on the farms, and the burden of meeting our taxes is intensified.

Intelligent improvement and maintenance of our highways, at a comparatively insignificant cost, would save enough money in transportation costs to pay off the nation's war debt within the lifetime of the present generation and leave a handsome residue in the treasury besides. This is a large statement but one susceptible of proof. We have 6,500,000 passenger cars in the United States today. Assume that a national highway system of 30,000 miles should be constructed and maintained by the government. If each of these cars traveled but 1,200 miles a year on the national system a saving of 1½ cent a mile in gasolene and tire costs would easily be effected or a total of $117,000,000 a year. Government figures show that a saving of 17c a ton mile in commercial traffic is made when roads are improved. The congressional investigation of 1912 deduced an annual highway traffic of 700,000,000 tons. A conservative statement would place the total today at 1,000,000,000 tons. On the assumption that but 1/5 of this traveled over the national system (and an improved road always draws much more) there would be a ton-mileage saving of $123,000,000. Since the average haul is 10 miles an hour the actual saving per ton of merchandise would be $340,000,000 a year.

Thus in two items we have arrived at an annual saving of $457,000,000, or more than is asked for over a period of four years in the bill introduced by Senator Townsend, of Michigan, proposing the construction of such a system as that outlined. When the saving in depreciation, the lowered cost of commodities to the ultimate consumer, the increased valuation of realty and broadened markets are taken into account, the sum already named becomes small by comparison.

Our counties and states have recognized the economic importance of road construction by appropriating more than $1,000,000,000 to local improvements. It is the nation's part to build and maintain those highways which are of national importance and which will serve to effect economy, facilitate interstate commerce and strengthen the common defense. The vision of the United States bound together by a network of durable highways is one which we should seek to make a reality at the earliest possible moment.

The means to the end is at hand in Senator Townsend's measure. It deserves and should have the active support of every economist, every business man, farmer, scientist, every American.

Commercial Auto Body Company Takes Over GMC St. Louis Plant

A further step in the progress of St. Louis as a center of automotive industries came recently with the announcement of H. F. Cartwright, president of the Commercial Auto Body Company, that that company had purchased the buildings and equipment of the plant of the St. Louis Manufacturing Corporation for the production of both passenger and commercial car bodies. The plant covers an area of approximately four acres, and has a daily average capacity of 550 passenger car bodies at present. Cartwright said it is his plan to build 300 commercial car and 200 passenger car bodies—daily at this plant, starting April 1.

The St. Louis Manufacturing Corporation, which is a subsidiary of the General Motors Corporation, will continue to build bodies at this plant until production starts at the new plant, which is expected to be March 1 or sooner.

The officers of the Commercial Auto Body Company are H. F. Cartwright, president; former Senator X. P. Wilfley, vice president, and M. E. Cartwright, secretary.

'Bus Line for St. Paul

A $50,000 corporation, the American Auto Transit Company, of St. Paul, has been incorporated with Julius Schmahl, Secretary of State, to operate an automobile 'bus line between St. Paul and South St. Paul. W. T. Kenny, president; J. A. Suerth, vice-president, and B. J. Lunny, secretary-treasurer, are incorporators of the company.

Operation of the new line will be opened with four 'buses. Four more will be added later. There will be twenty-minute service between the cities. Each 'bus will accommodate twenty-two persons.

The 'buses will start from the St. Francis Hotel, to the Saint Paul, down Fifth Street to Robert and over Robert to Concord Street to South St. Paul. The terminus will be at the Armour plant. On the return trip the 'buses will stop at the Ryan Hotel, then proceed up Seventh Street to the starting point.

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Fully Equipped Motor Trucks

By A. E. SCHAFER

General Sales Manager, Gramm-Bernstein Motor Truck Company

LET me preface all of my remarks by saying that in our opinion there is nothing new or novel in the proposition of selling motor trucks fully equipped, but instead, to our minds, there exists a real demand for what we are doing, backed by sound merchandising sense and well established precedent, all of which definitely point the way we are headed.

If you will pardon a personal allusion, I would like to take you back to 1910, when the passenger car industry was in its swaddling clothes and a state of more or less chaotic transition. All manufacturers were then groping and striving to know the wants of the market. At that time I was a motor car manufacturer on my own account, doing business in Cincinnati. Our company had been making some thousands of horse-drawn vehicles a year, and of course had some "horsey notions." That at least was what we were accused of, when we threw a bomb into the trade by being the first to announce a fully equipped passenger car. Such equipment then included acetylene gas generator, lamps, bulb horn, top with curtains, windshield, speedometer, foot rail and robe rail. My partner and self were roundly berated and called all sorts of things for our stupidity in giving away so much that had previously formed the basis of extra profits, and the prediction was freely made by the wise ones in the industry that the movement would begin and end with us. However, all of you here know whether it did or not. So much for precedent.

NOW I simply want to say in passing that while the automobile sales manager did for some years plume himself and arrogate to his position a super knowledge of marketing and as he styled it, "how to put it over," I for one have never been able to see where he has taught general merchandising anything, except the two valuable features of getting advance cash deposits on future contracts and selling his goods sight draft with bill of lading, both of which were invented, born and nurtured of necessity. Outside of those features the nearer he has followed well-established, stable ideas of merchandising, the stronger and sounder his organization has become. General sales management to my mind at once implies professional merchandising ability, in the exercise of which all of us, in better or poorer fashion, attempt to learn what is the public demand, what is the line of least resistance in meeting that demand, and the best way to work in harmony with both. One of the tests I like to put to any question is, "How would I like to be approached with it?" as well as, "Will doing it in a particular way conduce to the ultimate best good of the industry?"

Now to start with, you all know that except in very isolated cases, no motor truck can be used without a cab of some sort, as protection to the driver, and if a cab, why not of a type which will make driving comfortable for all weathers and climates. That being so, doors, windshield and curtains are indispensably necessary.

When attending a truck owners' conference here in Detroit a year ago, one of the speakers referred to the fact that one of the greatest difficulties they had found was to get good drivers—that they had first tried their former teamsters, but as they were the poorest and most unreliable class of labor known, they naturally were not successful as motor truck drivers. Someone thereupon asked why it was that teamsters were so bad and the speaker replied that, on account of their having to be out and unprotected in all kinds of weather, it was impossible to get a man as a teamster who could do anything else. That being so, does it not point the way to better motor truck drivers, and consequently, better results with motor trucks for both maker and user, if we can so equip them as to attract a higher class of help?

NOW in progressing further on the subject, let us start at the front of the motor truck and work back. Take the radiator guard—there are enough of these bought and paid for as extras each year to convince any one that there is a real need for them, and just to the extent that motor trucks multiply in number, just to that extent will the need for guards increase. The radiator of any automotive craft is by reason of its location, character and function a vulnerable and vital unit, hence it is only good sense to protect it from damage, not alone on account of the cost of repair but for the more urgent reason of obviating a lay-up of the machine. In fact, anything that can be done within reason to keep motor trucks out of the repair shop and in active service will conduce to their wider use and the greater prosperity of the industry as a whole.

The motometer is another small but valuable piece of equipment we have found, because by its telltale qualities the driver is quickly informed if he has overlooked filling up with water or oil, or if for any reason either one had leaked away, fan belt had broken, water pump key had sheered off, oil pump or lines had broken or clogged, etc. Under any of those conditions, motors heat up quickly, especially under heavy duty and slow running, and if conditions are not promptly relieved scored cylinders, burned-out bearings and other serious troubles ensue.

Electric generator and lights: It seems almost needless to argue in favor of or as to the necessity of electric lighting equipment as against oil or Prest-o-lite gas. When Mr. Gramm first exhibited an electrically lighted motor truck at Madison Square Garden in 1910, such appliances were not satisfactory and with their batteries would not successfully withstand the rough jolting of hard-tired motor trucks; still all of you know from your own experiences that electric generators with lights are thoroughly satisfactory these days, and, in fact, where motor trucks are driven after nightfall, especially in interurban work, there is no other form of lighting that can at all compare with it. You would scorn the man who would try to induce you these days to accept oil or gas lights for your house or passenger car; therefore, is there any reason, since electrical lighting equipment is now made right for motor trucks, that you should try to palm off something passe and antique on the motor truck buyer, simply because you can get away at a less cost? With the installation of electric generators and heavy-duty batteries an ample supply of "juice" is assured, so there then remains no reason to equip with hand horns as against the better and easier operated electric horn. In fact, it can be easily proved that many a costly accident has been averted by the quicker and better warning given by the more modern signal.

Passing to hub-odometer, which some have argued is not a necessity, largely because they do not equip with them, may I ask how else in reason the owner may determine the mileage his various motor trucks make, what his cost is per ton-mile for gas, oil and tires, secure proper tire adjustments, etc., or how often he should drain his crankcase in various seasons to keep his lubrication on the safe side?

NEXT comes army towing hooks. I wish I could have had some of you gentlemen down at our plant a few weeks ago when one of our old chain-drive, 6-cylinder motor trucks was being towed in from somewhere up the state, on account of a connecting-rod having let go and gone through the case. It was one of the heavy-duty type dumps, capable of about seven tons and consequently some load to drag along. Needless to say, it did not have towing hooks as part of the equipment and the towing was done by means of a chain around the front cross member, while the fellow who did the towing also did not have a draw-bar, and consequently, both front and rear cross members were pulled entirely out of shape and alignment. In the case of the dump it was necessary not only to heat and straighten out the front member but also to rerivet the front spring brackets, as well as put in new rivets further back, where they had been started by the distortion at the front end. Needless to say, that notwithstanding the age of the old chain-drive, its owner authorized towing hooks added to the repairs.

The foregoing applies equally strong or stronger to the need for spring trailer draw-bars, without which serious damage

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may result to the rear end of any motor truck towing another, by reason of distorting rear ends and loosening corners, thus allowing transverse frame action, bending of rear shackle bars, etc.

There is also another very good reason for the addition of that equipment, and that is to increase the efficiency and economy of the motor truck as a very modern medium of transportation, by hauling one or more trailers. The trailer manufacturers have been wide awake and active; they are educating the motor truck owner along trailer lines and we are not wise as sales managers if we do not insist on our product being equipped to meet these newer conditions.

Would you buy a passenger car stripped and then start all over again and buy top, curtains, electric lights, horn, robe rail, foot rail, extra seats, etc., or would you demand that the dealer price complete such an outfit as you told him you were looking for? Or, if you were on the dealer's side of the fence, would you like to first sell a man your motor truck and then go back after perhaps a hard wrestle on the major sale, and have to go all over the case again by selling him piecemeal the things you call extras, but which you know are actual necessities and the lack of which would not enable him to operate his motor truck as satisfactorily and economically in the long run?

How many dealers are there, when it comes to these so-called extras, who get full price for them? Do they not, instead, give many of them away entirely, thus forming only one more avenue for insidious price cutting and constantly reducing their average margin of profit, a thing we should all labor against his doing, because if the dealer does not make a proper and adequate profit, he will not continue long to handle any line, but will continue to change until he finally gives up motor truck selling altogether and tackles something else more profitable.

Now I believe that this association, young as it is, has already impressed much of the automotive trade of its intention and ability to do constructive things for the industry. Therefore, why not rise to the occasion, standardize on what shall continue a complete motor truck chassis and thus be the Moses that shall lead the trade out of much of the wilderness of irregularity that has obtained and into the promised land of a more stabilized condition with resulting better profits.

We say emphatically, "Don't put off the evil day," if you must call it that, but recognize the changed conditions and necessities of the trade and sell your product fully equipped.

Giant Crane Drops GMC Trucks Into Coal Cars at Pontiac Factory

One of the features of the GMC plant is the method of loading motor trucks for shipment. Such is the present shortage of rolling stock that the average manufacturer is pleased to get anything. The method of loading motor trucks in the automobile cars is simple enough, as the end doors permit of the machines running up skids on their own power. But when only coal cars and other gondolas are on the siding it is a far different matter.

This has been met by the installation of a gigantic crane which picks up a GMC motor truck, swings it around and deposits it in a coal car. After the machines have been anchored securely, so that the shunting of the gondola will not affect them, all is ready for the trip to destination.

Criss-cross Legislation Entangles Truck Drivers in Tri-State Cities

It was supposed that Illinois and Iowa had agreed to end the controversy of former years in respect to chauffeur's licenses and to dwell together in peace and harmony, permitting commercial car drivers from one State to cross into the other, without being required to show their chauffeur's licenses. It is now evident that Illinois went into the agreement with its fingers crossed, or with "reservations" which entitle the Sucker State to require drivers of Iowa motor trucks operating on the Illinois side, to display their permits, despite the fact that Iowa does not require such action upon the part of its own drivers or those from Illinois.

Iowa owned trucks are operated extensively in Moline, Rock Island and East Moline, Illinois, and an effort is being made by the business men of those cities to give the drivers of Iowa machines the same privileges accorded to Illinois motor trucks when crossing into Iowa.

Commerce to Double Output

The Commerce Motor Car Company, Detroit, has just acquired two more acres of ground adjoining its present location. As soon as the present additions being made to this plant are completed, it is reported that additional buildings will be erected on the newly acquired ground. This company is making plans to more than double its production of 1 to 2-ton motor trucks for 1920.

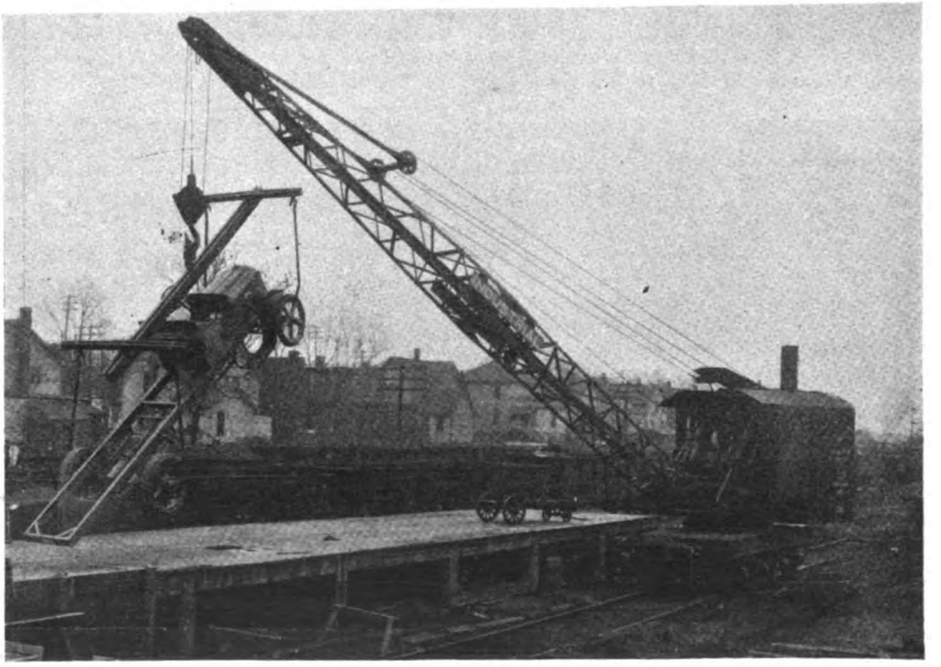
Little Known Drag-Links Form an Important Motor Truck Part

A Chicago corporation that maintains a fleet of more than 40 heavy duty motor trucks calls its drivers in every three or four weeks for an hour or two of instruction in motor truck mechanics. The object of the meetings it to so familiarize the men with their machines that they will be able to run them at the lowest possible cost for fuel, oil, tires and repairs. A practical garageman acts as teacher. Usually he talks, but now and then, to keep the men interested, he asks questions.

"What do you know about drag-links?" he inquired of his drivers recently.

There wasn't much response. He pressed the question—and found after much pumping that of the 40 men present (all of them drivers), only 12 could tell what a drag link was, or where it was located. While one of the relatively small, yet the drag link is also one of the highly vital details, of motor trucks, tractor and automobile make-up—it is the device that connects the steering-arm, at the lower end of the steering-gear, with the knuckle thrust-arm of the front wheel. Any failure of the drag-link to function means a car or motor truck out of control. When motor vehicles first came in, it was the custom of manufacturers to make their own links. But within recent years a large industry having to do with the production of these and kindred parts has grown up. It is a highly specialized branch of the automotive accessories business, with its own minor and major factors. One of its most representative members is the Cincinnati Ball Crank Company, of Cincinnati, a typically American institution—the result of the union of a little thing with a big idea.

When Clifford Greene, its president, formed the Cincinnati Ball Crank Company in 1906, he had on his payroll a dozen or fifteen men. Machine tool handles were the company's sole product. To-day



Crane used for loading GMC motor trucks.

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the firm turns out more drag-links and machine tool handles than all other makers combined, while the plant itself spreads over several acres.

The production of the Cincinnati factory, which includes drag-links, stabilizers, radius-rods, tie-rods, compression couplings, starting cranks and many similar products, runs as high as 15,000 parts daily.

Recently the engineers of the Cincinnati Ball Crank Company brought out a patented and much better drag-link than that which the industry has been using for the last several years. The new Cincinnati link is of seamless drawn steel tubing without welds. Every part of this link is equally strong. The provision for automatic lubricating makes steering easier and reduces wear on the ball and sockets of the steering connections. A radius-rod, similarly improved, has also been devoloped, while volume production for a stabilizer for Fords and other cars—a stabilizer built on distinctly new lines—is expected to be attained within a few weeks.

Luverne Quick-Change Wheels

To meet the requirements of those who have solid-tired motor trucks and wish to change to pneumatic-tire equipment without the delay and trouble of having their old wheels changed, the Luverne Automobile Company, of Luverne, Minnesota, has placed on the market a complete line of pneumatic-tired motor truck wheels. These wheels are furnished in various sizes to fit the different makes of motor trucks and are equipped with Firestone demountable rims and any make of tire desired in sizes ranging from 32 by 4½-inch up to 42 by 9-inch. These wheels are all-wood artillery wheels of the standard type. They are furnished without hubs, but with suitable bore and dimensions to fit customers' hubs.

Anyone who wishes to change his motor truck tire equipment to pneumatics can do so, the change taking but a few hours. This plan eliminates all necessity for laying up the motor truck, reduces the cost of making the change, makes a better job, and leaves the old wheels intact for further use should there be occasion to use them.

Rivalry of Wholesalers Boosts Motor Transport

GRAND RAPIDS SUPPORTS 19 LINES

What ship-by-truck can mean to wholesalers is well illustrated, its advocates point out, in Grand Rapids, Michigan, where its 19 routes, operating 32 motor trucks, have the staunch support of wholesale dealers in fruits, groceries and drugs. These Grand Rapids dealers are backing "ship-by-truck" because, by speeding their consignments to neighboring Michigan towns, it permits them to compete with Milwaukee wholesalers.

Last spring the Grand Rapids men found that the Milwaukee wholesalers were making substantial inroads on their business. Lake transportation was making it possible for the Wisconsin dealers to get their shipments into the territory more quickly than could the Grand Rapids houses. They were sending it into the Michigan port cities that had the best railroad facilities, and it was being speeded along to its destination with little delay. Grand Rapids dealers, dependent entirely upon the railroads, were not so fortunate in obtaining quick deliveries. Then the ship-by-truck idea came along, they adopted it, and now they claim they are far outdistancing their rivals.

In Grand Rapids ship-by-truck operates through a central terminal. This terminal operates under the name of the Associated Truck Lines of Grand Rapids. It was started in June, 1919. By the first of the following September it had outgrown its original quarters and was forced to move to a larger place. To-day more than 170,000 pounds of freight is leaving its two loading platforms daily. Incoming freight representing return loads is 60 per centum as great. The shortest route is 22 miles long. The longest is 50 miles.

Deliveries to Muskegon and Grand Haven, the two principal cities in which Milwaukee competes with Grand Rapids, are made by 5 p. m. of the day an order is received in Grand Rapids, provided the order is telephoned in before noon. Deliveries are made to Kalamazoo the same day an order is received, if it is telephoned to the wholesale house before 10 a. m.

Delivery by the wholesaler to the terminal station saves the motor truck the time that would be required in making a "pick-up." This is the big advantage found in the central terminal system. It expedites the handling of incoming freight in the same manner, the consignee or his agent calling at the terminal for it.

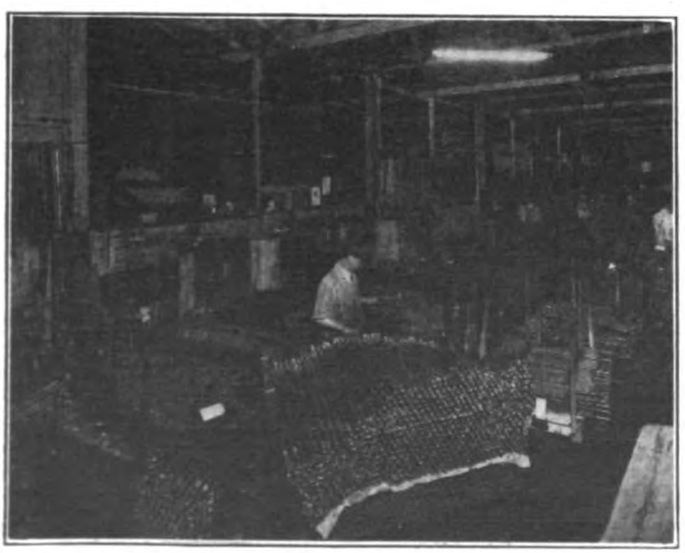
In addition to that at Grand Rapids, central terminals for motor trucks are successfully operated in Minneapolis, St. Paul and Louisville.

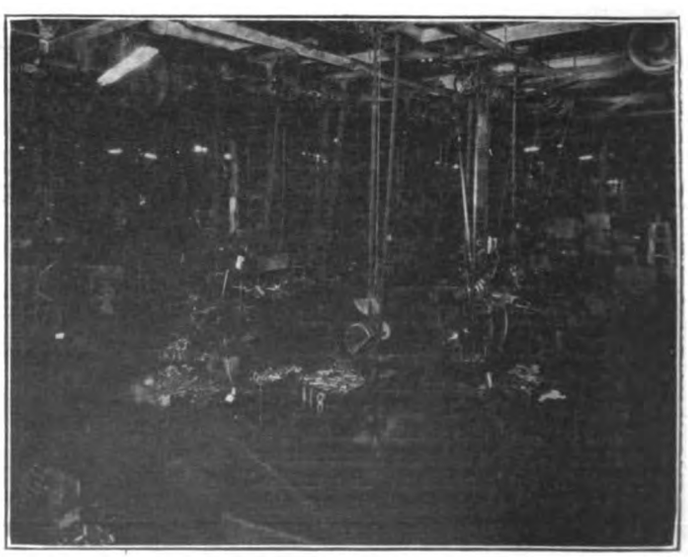
New Haven Show February 16

For a number of years, New Haven, Connecticut, business, in the automotive line has been smothered and suffered encroachment at the hands of the New York and Boston shows. Various automotive dealers at frequent intervals, in the past, have attempted to organize a dealers' association in New Haven. It remained, therefore, for C. A. Bradford, one of the oldest passenger car, motor truck and tractor dealers of the city, to succeed in his efforts at organizing, and he, together with W. A. Rutz, George Wuestefeld and thirty others, have now organized the New Haven Automotive Dealers' Association. This year the association is thoroughly established and during the week of February 9-14 inclusive there will be a passenger car show in the Arena at that city. It is expected that eighty-five different makes of cars will be shown, besides an unusually large allotment of space has been made to the different accessory manufacturers. The truck and tractor show will be held February 16-21.

Schacht Joins Multibestos

The Multibestos Company, of Walpole, Massachusetts, manufacturers of Multibestos brake-lining, has just announced the appointment of Walter L. Schacht as a member of their organization. Mr. Schacht will assume the managership of the Metropolitan New York district, with temporary headquarters at 158 Robinson street, Brooklyn.





Scenes in Cincinnati Ball Crane Company's plant—making drag-links.

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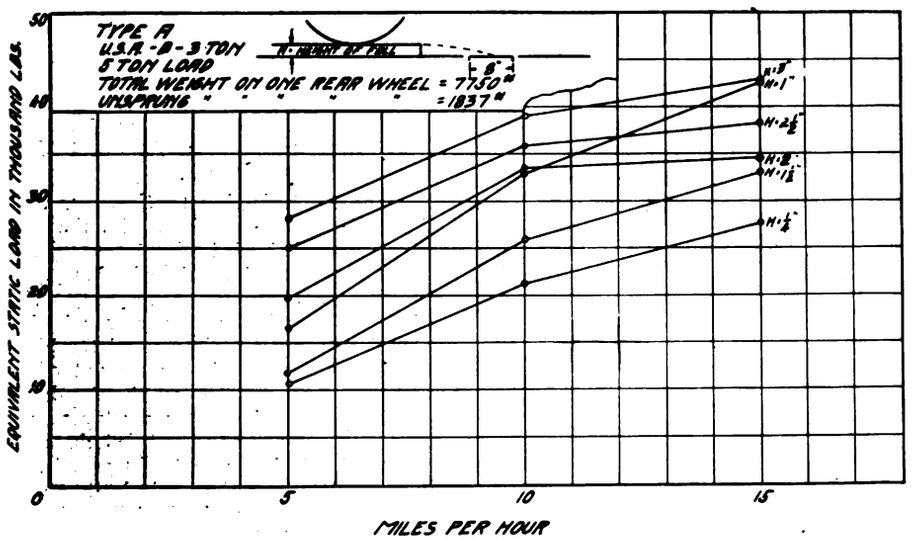
Present Status of Impact Tests

By A. T. GOLDBERG
Testing Engineer, United States Bureau of Public Roads

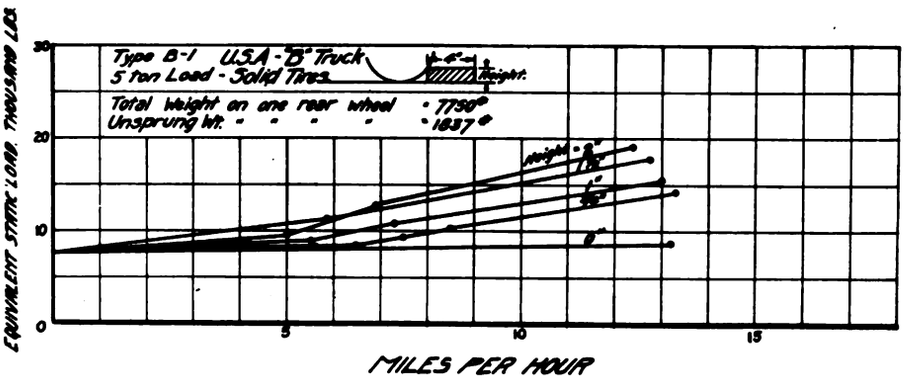
IT has been estimated that the funds available for highway construction in this country during 1920 total $633,000,000, and this is more than four times the amount expended in any other previous year. It is likely that the future will show even higher figures than these and that road construction will be pushed as rapidly as road material resources, equipment, hauling facilities and labor will permit. In the face of such an enormous program it behooves us to build wisely lest we be extravagant either by too much or by too little initial expenditure for our various road systems.

Unfortunately, the necessity for such vast expenditures comes almost simultaneously with a new class of traffic which exerts a different kind of destructive effect on roads than has been exerted by traffic in the past. The heavy motor truck has transformed the road problem from one whose solution, in days gone by, depended upon precedent, into an exceedingly important problem of design. We must be able to design our future roads to carry known maximum loads under known conditions of subgrade and weather, just as we are now able to design our bridge structures. We must not be satisfied with a constant cross section irrespective of subgrade conditions, but we must change the design of the road as nearly as practicable with changing conditions of subgrade. At the same time we must better subgrade conditions by more careful drainage. Recognizing these facts, and with rational design of road surfaces as a goal, the Bureau of Public Roads has begun experiments to find out something of the fundamentals affecting road design.



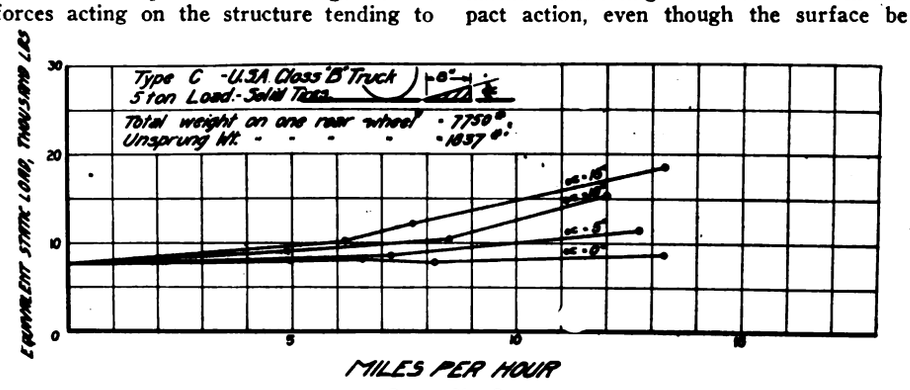
Curve No. 1.

ture, the design of a road requires not only a knowledge of the materials in the structure and their behavior under stress,



Curve No. 2.

Just as in the design of a bridge structure, but it also requires a knowledge of the forces acting on the structure tending to deform it out of shape. Obviously, then, one of the fundamental problems is to determine just what forces are being exerted on roads tending to destroy them.



Curve No. 3.

Anyone who has stood on a hard road surface during the passage of a heavy motor truck has noticed the vibration set up in the pavement, indicating that the machine is exerting more or less of an impact action, even though the surface be comparatively smooth. Such action, of course, is much accentuated after the surface becomes worn in spots or wavy and the impact then becomes very noticeable. Heavy loads at rest on road surfaces exert but little effect except on surfaces which for some reason are too soft to bear the load. Actual tests have been made on a concrete road to gain some idea of the fibre stress in the concrete directly under a heavy wheel load of a loaded motor truck.. The indications are that when a wheel load of 8,500 pounds is at rest on an 8-inch concrete slab laid on a rather wet clay subgrade the fibre stress in tension is only about 34 pounds per square inch directly under the load, and since the modulus of rupture of the ordinary concrete road mixture is well over 400 pounds per square inch, and possibly as high as 600 pounds per square inch, the danger of serious cracking of the concrete under static loads is practically nil except at the corners of the slabs.

We must turn to impact then for an explanation of some of the past failures of road surfaces under motor truck traffic. How great can these impacts be as compared with the static weight of motor trucks? What impacts are likely to be exerted on road surfaces depending upon their degree of smoothness, and what ef-

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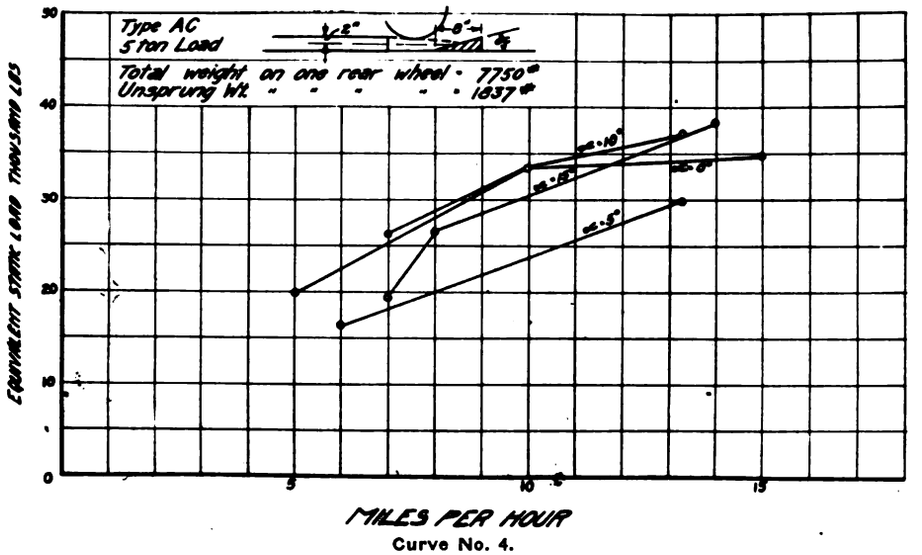


Curve No. 4.

fect have these impacts on different kinds and thicknesses of surfaces when laid on different subgrades? These are some of the questions we must answer before we can hope to design a road rationally.

The impact tests now being conducted by the Bureau of Public Roads aim to determine:

(1) The amount of impact delivered to road surfaces.

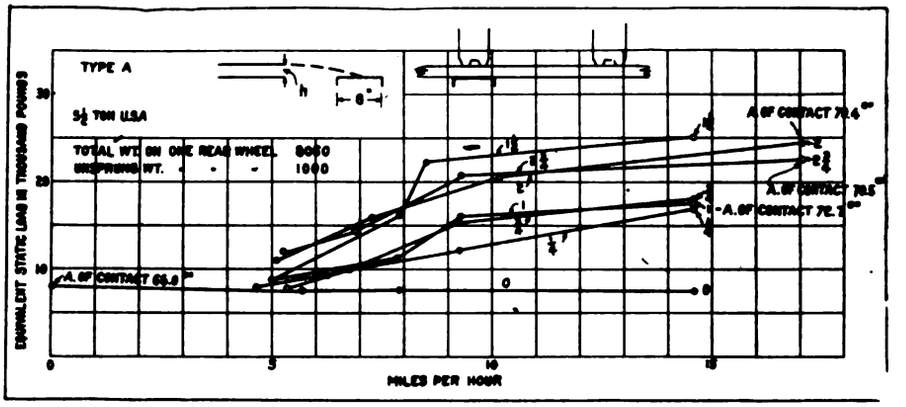
(2) The effect of this impact on different types of surface.

The method now being used for measuring the amount of impact delivered by motor trucks has been described elsewhere.* In brief, it consists of delivering the impact of a moving motor truck to a small copper cylinder, the blow deforming the cylinder a definite amount, depending on the intensity. In these experiments a concrete pit has been constructed in the road surface and a hydraulic jack has been placed in this pit. The plunger of the jack is enlarged at the top with a platform of suitable size for receiving the blow of one wheel of the motor truck. The copper cylinder which measures the blow is placed under the plunger of the jack and the blow is transmitted through the plunger to the copper cylinder. The cylinders used are turned from ½-inch copper rod and are ½ inch in length. A large number of these cylinders are prepared and are given a special heat treatment to make them uniform in their physical characteristics. A number of them are selected from each lot prepared and are subject to pressure in a testing machine and the deformation of the cylinder is noted for each load applied. In this way it is possible to check up the uniformity of the lot of cylinders and also to determine how much load is required to deform them to a definite length. The impact deforming the copper cylinder is stated in terms of the static load required to deform it to the same length.

A little thought will show that there are a number of different ways in which impact can be delivered to a road by a motor truck and the test has been arranged to approximate these different conditions. For instance, the motor truck while in motion is caused to fall through definite heights striking the plunger of the jack. Again the motor truck is made to strike obstructions of different heights placed directly on the plunger of the jack and, as described, later, several other variations of impact have been investigated.

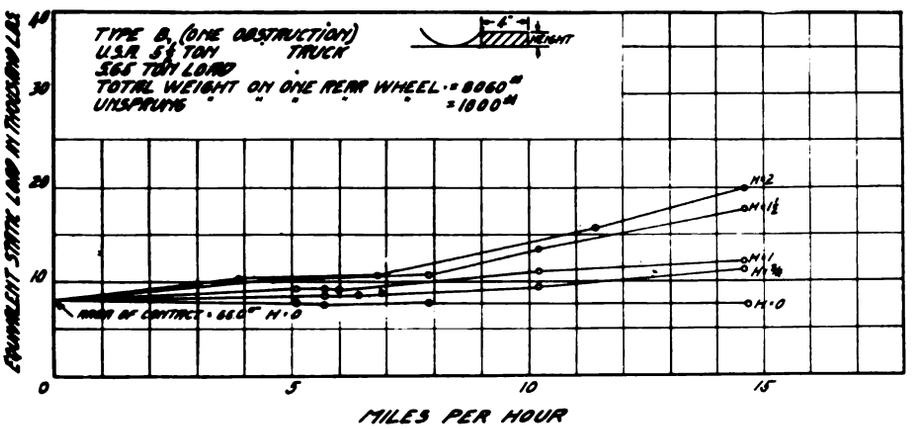
The speed of the motor truck has been made one of the variables in these investigations in order to permit of determining something of the law of the effect of speed on impact. Different sizes and makes of machines loaded with different loads are being used. Thus far the tests have been confined to solid-tired vehicles, but it is the aim to extend them to an investigation of pneumatic tires and to special types of cushioned wheels and special tires. The impact of the rear of the motor truck has only been investigated, as this impact is greater than that of the front wheels.

In this discussion no attempt will be made to treat of all the results obtained, but rather the essential features of the data will be pointed out. A number of curves are given and these have been selected from a large number of tests results because they in general show the maximum impacts that have been measured. In the tests here recorded, a Class B, 3- to 5-ton standard army motor truck, a 5½-ton and a 1½-ton motor truck have been used. All of these machines are supplied by the Motor Transport Corps of the War Department.



Curve No. 6.

*Preliminary Report of Impact Tests of Auto Trucks on Roads, by E. B. Smith and J. T. Pauls, Public Roads, July, 1919.



Curve No. 5.

Curve 1. Referring to *Curve 1*, which shows the results obtained with the Class B Army truck loaded with 5 tons of sand and having a total weight of 7,750 pounds on one rear wheel and an unsprung weight of 1,837 pounds on one rear wheel, it should be noted that in general the higher the fall the greater is the amount of impact produced. The maximum impact pressure, when the motor truck was running 15 miles per hour and fell through a height of 3 inches, was 42,000 pounds, and this was 5.4 times the static load pressure exerted by the rear wheel. When the rear wheel dropped through a height of only ¼ of an inch at 15 miles per hour, the impact pressure produced was 28,000 pounds, or 3.6 times the static load pressure. It will be well to note here that the unsprung weight of this motor truck is

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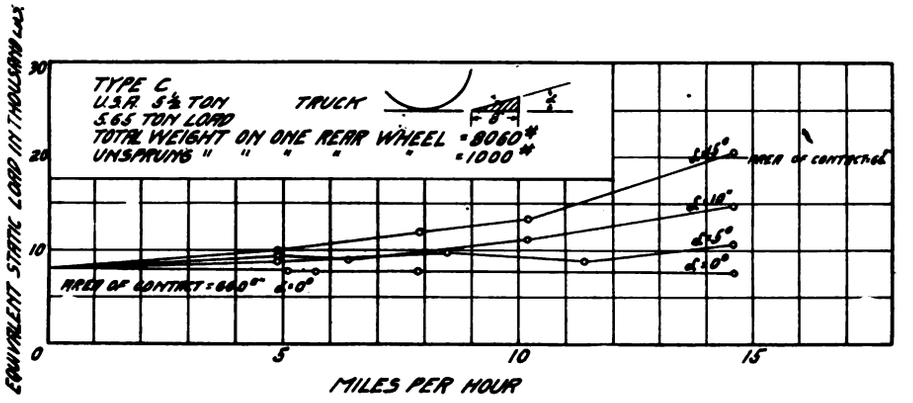
very heavy and it will be seen, as pointed out later on, that this has the effect of producing high impact pressures.

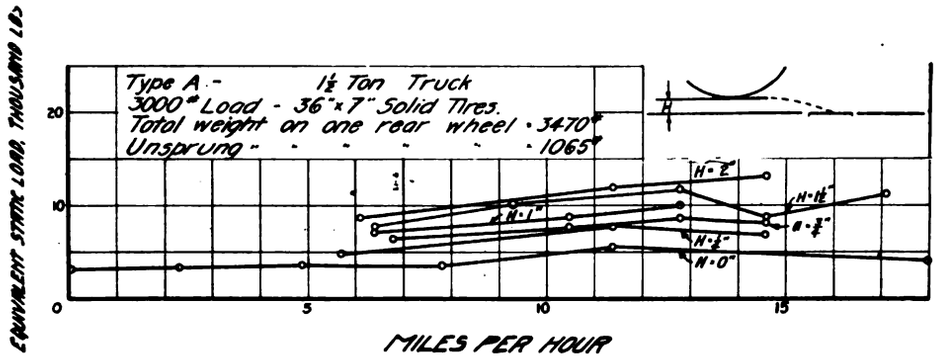
Curve 2. In *Curve 2* the same motor truck loaded in the same manner as above was used, but the rear wheel of the truck was caused to strike an obstruction which was placed on the plunger of the measuring jack. It will be noted that this condition of impact is very much less severe than show in *Curve 1* described above. In general, the impact pressure seems to increase with the velocity and also with the height of the obstruction.

Curve 3. In obtaining the results shown on *Curve 3,* wedge-shaped blocks were mounted on the plunger of the jack, the angle of inclination of the blocks being varied for the several tests. The rear wheel of the motor truck simply rolled over these wedge-shaped blocks and produced pressure on the copper cylinder as shown in the curve. As would be expected, the pressure produced increases with the angle of inclination of the block and also increased with the speed. This condition of pressure is realized in the road surface when a motor truck rolls into a depression and the wheels strike the far side of the depression, and these



Curve No. 8.

motor truck at different speeds and allowing it to fall through different heights. It will be noted in general that the pressure increases with the speed and to some extent with the height of fall. In the particular set of results recorded here, both wheels were allowed to fall through a definite height, whereas in the other tests only one rear wheel was allowed to fall. When two wheels fall through a certain height a slighty increased pressure under one wheel is produced than when



Curve No. 7.

tests show that the steeper the far side of the depression the greater will be the pressure produced on the road.

Curve 4. Should the depression be deep enough and the speed of the motor truck sufficient, the wheels will leave the surface of the road, jumping over the depression and landing on the far side with considerable impact. This condition was tested by placing wedge-shaped blocks on top of the jack as in the previous test, elevating the point of jump-off and running the motor truck at a speed such that it fell on the center of the wedge-shaped block, giving pressures as shown in *Curve 4.* The height of fall in each of these cases was 2 inches. It will be seen that this gives a very severe condition of impact. These tests were very difficult to make, as it necessitated very careful driving to make the rear wheel land directly on the center of the jack. A large number of runs had to be made before results of any value at all could be obtained.

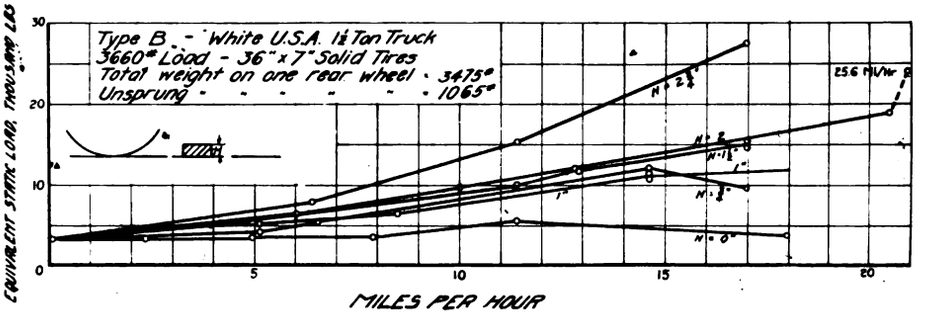
Curve 5. In *Curve 5* results are shown obtained with a 5½-ton motor truck carrying a load of 5.65 tons, having a total weight of 8,060 pounds on one rear wheel and an unsprung weight of 1,000 pounds on one rear wheel. The tests shown in this curve were obtained by running the one wheel only falls through the same height.

Curve 6. In *Curve 6* the pressure measured was produced by the motor truck striking an obstruction placed on the jack, and this pressure is much less than in the previous case, as shown in *Curve 5.* The same general tendency for pressures to increase with the speed and with the height of the obstruction is shown just as in the case of the Class B army motor truck.

Curve 7. In *Curve 7* are shown the results obtained when the motor truck rolled over wedge-shaped blocks placed directly on the jack. The same general shape of curves was obtained as in the case of Class B machine, the intensity being somewhat less in this case.

Curves 8, 9, 10. These curves show the impact pressures produced with a 1½-ton motor truck carrying a load of 3,660 pounds having a total weight on one rear wheel of 3,475 pounds and an unsprung weight of 1,065 pounds. In *Curve 8* results were obtained with the motor truck falling through various heights to the weighing device. In *Curve 9* the obstruction was placed on the weighing device and in *Curve 10* wedge-shaped blocks over which the motor truck rolled were placed on the plunger of the device for measuring the impact pressure. These curves are of the same general shape as the preceding ones and in view of the fact that this machine was lighter, the pressures obtained were less than previously described.

It is seen from the preceding test results that under certain conditions the impact pressure produced by heavy motor trucks is very large, the highest pressure thus far measured being in the neighborhood of 42,000 pounds when the weight on the rear wheel causing this pressure was only 7,750 pounds. It was pointed out that the unsprung weight on one rear wheel of this motor truck was 1,837 pounds. In the case of the 5½-ton motor truck, which has an unsprung weight of 1,000 ponds, it has been shown that the impact pressures produced were very much smaller than in the case of the Class B army truck. Considering a specific case, when the Class B army truck, whose total weight of 7,750 pounds on one rear wheel, unsprung weight of 1,837 pounds on one rear wheel, fell through a height of 2 inches at a speed of 15 miles per hour, the impact pressure produced was about 34,500 pounds. In the case of the 5½-ton motor truck loaded with a load of 8,060 pounds on one rear wheel, with an unsprung weight of 1,000 pounds on one rear wheel,



Curve No. 9.

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and under corresponding conditions of speed and height of fall, the impact pressure produced was only 23,500 pounds, or only 68 per centum of the impact pressure of the army motor truck. The unsprung weight of the 5½-ton motor truck was only 56 per centum of that of the army motor truck, whereas the gross load carried on the rear wheel was slightly larger in the case of the Class B truck. The indications are, therefore, that a light, unsprung weight tends to lessen the impact of a truck on the road surface.

Referring to *Curve 9*, giving results for a 1½-ton motor truck having a total weight of 3,470 pounds on one rear wheel and 1,065 pounds unsprung weight on one rear wheel, the impact pressure at a speed of 15 miles per hour and with a height of fall of 2 inches was in the vicinity of 14,000 pounds per square inch. It will be noted that the unsprung weight of this machine is practically the same as that of the 5½-ton and the impact pressure produced is very much lower than in the case of the 5½-ton motor truck, so that it can not be said that unsprung weight alone influences the impact pressure produced on the road but the sprung weight also exerts some influence on this pressure.

THESE facts are very significant, for they show that the gross load of a motor truck is not the only factor which influences the pressure of the wheels of the machine on the road surface. It is possible to have vastly different impact pressures exerted on the road by two different motor trucks both having the same gross weight, but having different distribution of their sprung and their unsprung weights, and when questions of road design are to be considered, the actual wheel pressure on the road is the all-important thing rather than the gross load of the motor truck. Would it not seem logical to take these facts into consideration in framing legislation dealing with the restriction of maximum sizes of motor trucks on roads, and, moreover, do these facts not open the way toward a more equitable system of license fees than the more or less arbitrary systems based on gross load, carrying capacity or horse-power now in use?

The effect of the speed of motor trucks on the amount of impact produced on road surfaces is indicated by these tests. It has been stated that the impact of vehicles on roads varies as the square of the speed, but the present tests indicate that within practical speed limits this is not the case. In the results obtained thus far the impact on the road varies with some power of the speed, this power, however, being less than two and extending down as low as one. The present data do not warrant a close analysis to determine this relation.

At first thought it would seem that the impact should vary directly as the height of the fall when a motor truck rolls off an obstruction and falls on a road surface, but these tests indicate that this is not true, the reason being that the action of the springs of the vehicle give the unsprung weight an acceleration above that due to gravity and, depending upon the spring action and upon the amount of sprung and unsprung weight, the impact effects with various heights of fall are likely to vary with different motor trucks. The amount of spring deflection at the instant the impact occurs is another factor influencing the amount of impact on the road.

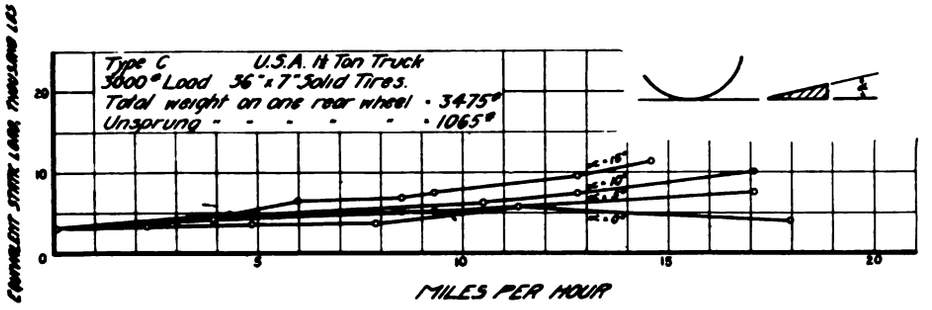
HAVING determined the amount of impact exerted on surfaces by motor trucks under these artificial conditions, the next question arises as to what impacts are actually produced on road surfaces of different degrees of roughness. Undoubtedly the road having a rough surface will be subjected to greater impact than the smooth road, and information of this character has as yet not been obtained, but it is hoped that it will be possible to obtain these results within the coming year by means of special equipment now being constructed.

What use shall be made of the results of the impact tests in the design of road surfaces? The theory for the design of beams under static loads states that the strength of the beam varies as the square of the depth, and in one instance use has been made of this theory to place road surfaces of different kinds on an equal basis so far as their load-carrying capacity is concerned. On the other hand, it may be shown theoretically that when loads are applied with impact on beams their strength varies directly as their depth and not as the square of the depth. With rubber-tired vehicles it is a question as to whether the impact produced is of a suddenness requiring design by the latter theory, and it would seem to be reasonable that in view of the cushion effect of rubber tires the load-carrying capacity of the slab will vary as some function intermediate between D and D^2. When the proper theory to use is determined, knowledge of the amount of load applied by impacts will permit of actually designing roads to properly sustain these loads.

Having obtained the amount of impact exerted by motor trucks, the next question is that of the damaging effect of impacts on road surfaces. We are attempting to gain some information on this point through a series of tests now under way. We have constructed a number of slabs 7 feet square laid directly on the subgrade. Half of these sections are laid on a subgrade which is purposely kept wet and half of them are on a well-drained subgrade. The sections thus far constructed include concrete in depths varying from 2 inches to 10 inches and brick constructed on varying thicknesses of concrete base. Various kinds of brick have been used, including repressed, wire-cut lug and vertical fibre brick. We have used monolithic, semi-monolithic and sand cushion construction; both Portland cement grout and bituminous mastic fillers have been used. One section is laid on a bituminous mastic cushion with a bituminous mastic filler. In other sections the brick have been laid directly on the subgrade and in still others on a prepared macadam base. We are testing these slabs by means of an impact machine which is designed to represent the condition existing on the rear wheel of a motor truck.

THIS machine has an unsprung weight of 3,000 pounds and will carry a sprung weight of 9,000 pounds. These weights correspond approximately to those that would exist on the rear wheel of a 7½-ton motor truck. The lower end of the sprung weight is shoed with a solid rubber tire and the whole weight will be raised to a height such that when allowed to fall, the impact delivered will be one that might be delivered by a 7½-ton motor truck. The observations will consist of noting the behavior of the surface under repeated impacts of this machine and will also include measurements of deflection of the surface. Nothing can be said of the results at the present, as the tests have not progressed to that extent. We aim to continue these investigations with bituminous surfaces laid on concrete bases using a 1:3:6 as well as a 1:1½:3 base. In addition, broken stone bases will be used under the bituminous surfaces.

With the completion of these tests it is hoped that sufficient data will have been accumulated to place the design of roads on a much sounder basis than at present, and it is hoped that the results combined with the results of still other investigations will finally lead to a suitable method for determining with certainty on road types and cross-sections for definite subgrade and load conditions.



Curve No. 10.

Kimball Joins Pierce

A. L. Kimball, formerly Chief Engineer of the Fulton Motor Truck Company, is now sales engineer for The Pierce Governor Company, Anderson, Indiana, having charge of the territory east of Indiana. Mr. Kimball is a man of wide experience in the automotive industry, having previously been employed as experimental engineer for Hudson motor car company, Chalmers Motor Car Company, and Dodge Brothers. He is a graduate of the University of Michigan and a member of the Society of Automotive Engineers.

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Trucks in $2,000,000,000 Industry

By ALFRED REEVES

General Manager, National Automobile Chamber of Commerce

NOTWITHSTANDING the small production during the first three months of 1919, following the armistice, when the industry was on practically a 100 per centum war basis, motor car manufacturers made such gigantic strides during the other nine months that the year's production of 1,891,929 motor vehicles exceeds all previous records, including 1917, when 1,868,000 cars and motor trucks were produced. The wholesale value brought the industry almost to the two-billion-dollar class.

It was only twenty years ago when automobiles were barred from Central Park—yet within these two decades no year has gone by except the war year of 1918, which has not seen an increased demand for these time-saving vehicles now such an important part of our American life, having advanced from the position of toys for the rich to a position on a par with the telephone, telegraph and the railroads, in their work of transporting men and merchandise.

Passenger car production was slightly less than in 1917, totaling 1,586,787, as against 1,740,000 for 1917. The motor truck production, however, increased substantially, rising from 227,000 in 1918 to more than 305,000 in 1919. The total wholesale value of passenger cars was $1,399,282,995, an average of $882 per car; while the motor truck value was $408,311,585, an average of $1,338 per vehicle. The total value of these products was $1,807,594,580, which, when combined with the wholesale value of bodies, spare tires and accessories to equip the cars or motor trucks ready for the owner's use, brings the industry close to the two-billion-dollar class with a practical certainty that this year its position will be second only to steel among the manufacturing industries of the country.

THE rapid advance of the motor truck has resulted from its meritorious performance in the war, in general commercial life, in connection with rural motor express lines and in practically every other department of commerce. 'Buses are increasing in great number, it being worthy of note that in Newark, New Jersey, 16,000,000 passengers were carried by 'buses during the first half of 1919, the fares amounting to $800,000. Some highly interesting figures in connection with the industry dating from 1899 are given in the accompanying table.

Passenger car production in 1920 should be not far from 2¼ million cars with motor truck production 400,000 to 425,000. It will depend largely on materials, particularly in connection with closed cars, for which the demand is increasing tremendously.

Exports are now only about $110,000,000, but this should increase substantially during the next few years. The world's markets are being covered by the automobile industry, our automobiles going last year to 81 different countries, including Iceland, which bought 21 cars and 2 motor trucks. There is a normal replacement annually of about 16 per centum of the cars and motor trucks in use. Final figures from the various states would indicate that almost seven million motor vehicles are now registered and running in the United States. Of this number, about 10 per centum are motor trucks.

The biggest percentage of increase in the registration of cars during the past two years has been in the agricultural districts. The dealers are Tennessee, Alabama, Louisiana and Georgia, where the percentage of increase over 1918 has ranged from 29 per centum down to 16 per centum. New York has the greatest number of cars registered, approximately 570,000, or one for every 18 people in the state. Ohio is second with about 511,000.

NEBRASKA and Iowa are pretty close for the honor of the greatest number of cars per capita, Iowa with 365,000 and Nebraska 201,000, or one car for every 6½ persons. Mississippi has the fewest cars registered, less than one for every 50 persons, with Alabama next—one for every 43 persons. Better roads are expected to change this situation.

Just how many cars can be used in the United States depends entirely on the improved roads and bettering the traffic conditions in big cities by the use of underground garages and parking places for cars not in use. There are many who believe that a few years from now will see 12,000,000 motor vehicles running in this country.

Notwithstanding its giant strides in twenty years, the industry has not been one in which it was easy to succeed, as evidenced by the fact that more than 700 makers failed or retired from the business during the past six or seven years. Many new companies now going into the business will find the road difficult and success coming only to enterprising, well-financed and well-managed concerns having vehicles on a par with those now in use.

One of the real reasons for the great growth of the automobile industry has been the appreciation that every person wants an automobile. It is generally a question of price. The makers, therefore, worked to bring down prices and thus permit of increased production, which in turn brought prices down still further. The industry is looked upon as the leader of standardized production. In its co-operative and constructive work it sets a worthy example to other industries.

The 123 makers in the National Automobile Chamber of Commerce have ever been ready and continue to be ready to give and take, in a manner that has helped to make the industry what it is and has been—real co-operation exists to an extent that is not found in any other industry. Whether it is standardizing on tires, co-operating for foreign trade, helping in the distribution of freight cars, combating unfair legislation, exchanging patents without payment of royalties, advocating and showing the way for more and better highways, agreeing on car designs that will lessen the cost of fire, theft and liability insurance to be paid by owners, standardizing on repair parts and service policies to the ultimate benefit of the consumer, coöperating in the promotion of automobile shows, fostering plans for the extension of rural motor express, working with the representatives of the oil industry with a view to insuring proper and plenty of gasolene, or in scores of other ways, the automobile manufacturer will continue to show that his ideas of coöperation are not theoretical but practical, and by his support insure a continuance of this wonderful industry on a bigger scale than ever before.

PASSENGER CAR PRODUCTION.

Year.	Number.	Wholesale Value.
1899	3,700	$ 4,750,000
1904	21,281	23,634,364
1909	127,731	159,918,506
1914	543,679	413,859,379
1917	1,740,792	1,053,505,781
1918	926,388	801,937,925
1919	1,586,787	1,399,282,995

Average wholesale price for 1919—$882.

MOTOR TRUCK PRODUCTION.

Year.	Number.	Wholesale Value.
1904	411	$ 946,947
1911	10,655	22,292,321
1917	128,157	220,982,668
1918	227,250	434,168,992
1919	305,142	408,311,585

Average wholesale price for 1919—$1,338.

Ohio Is Truck Center

Ohio has been noted for many things, from presidents to heavyweight prize fighters. Now she is adding new laurels to her wreath. According to figures recently compiled by the Clydesdale Motor Truck Company, located in Clyde, Ohio, the Buckeye State is rapidly taking over the leading place in the matter of the production and distribution of motor trucks. There are already 314,029 registered motor trucks operating in the United States, and it is estimated that as many more are operating which are not specifically registered as motor trucks.

Of this whole number, Ohio registers 57,000. She is closely followed by Pennsylvania and Michigan, both of which are contiguous to her boundaries. Indiana does not rank so high, but her next-door neighbor, Illinois, is well up among the leaders. In the south, Kentucky holds a place of prominece, although all of the states below the Mason and Dixon line are far below the Middle West in the number of motor trucks operated within their borders.

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"Honk! Honk!" a Motorized World

By ROLAND R. CONKLIN
President, Chicago Motor 'Bus Company

IN the mass of cable dispatches from England recently, one small item appeared which is of vast importance to the motor world. It told of the determination to continue the use of motor lorries for the transportation of certain types of freight and express.

During the recent railroad strike in Great Britain, hundreds of these motor trucks which were used during the war were put into freight and express service as an "emergency measure," but, like the man who went to scoff and stayed to pray, these motor trucks are to be used permanently for hauling small package freight for short distances.

The transportation authorities found that yards and warehouses were terribly congested when this great railroad strike began. The first few days found increased confusion, and then the motor truck entered into the situation. It was backed up at a freight warehouse, loaded, and then set out upon its destination, dropping packages at way stations. During the first few days of the new service, such packages as were paid for were not left at a freight station, but were delivered at the house of the consignee, thereby obviating the necessity of an extra handling. This soon proved to be one of the great advantages of the motor truck in handling this freight, and was a decisive factor in making motor truck lines permanent.

IT WON'T be long before a motor truck will drive up to a factory in London and take on a sewing machine consigned to Manchester, delivering it there to the party who expects to operate it. Under the old method the machine would have been delivered to a railroad freight station, where it would have been unloaded from the delivery wagon on to a platform, and then loaded into the freight car. Perhaps it would again be transferred en route. At Manchester it would have been unloaded from the freight car, reloaded on to a wagon, and then delivered.

The action of the English traffic experts in continuing this service is highly significant, and I believe marks the beginning of a new method of handling small package freight and express in civilized countries the world over. I think in this situation the English have set an example which we may well follow in the more thickly populated sections of the United States. In fact, that has been done to a limited degree between Washington and Philadelphia, New York and Boston, and I believe it will not be so many years before motor express lines will be running between all the large cities of the East and Middle West.

The advent of the concrete road which is making its appearance in the Middle West and in certain parts of the north Atlantic states will be a great help in this direction.

It is quite practicable to build large, roomy 'buses, which can carry passengers on top and freight below. Even granting that special construction of concrete roads would be necessary on the part of the operating company, freight and passengers could be carried more quickly and with greater safety and speed than on the present interurban electric lines. Concrete roads can be constructed at approximately $20,000 per mile, and not over $15,000 investment per 'bus-truck would be necessary in installing a freight and passenger 'bus line, allowing for garages, repair shops and storage warehouses. Taking into consideration the cost of grading, rails, crossties, trolley poles, wires and the maintenance of power houses and highly complex equipment necessary in conducting an interurban line, motor vehicles on their own concrete roads will very successfully compete with the electric carrier. In fact, just as the electric interurban is a competitor in certain circumstances to steam railroads, so will the motor vehicle take certain business from the railways.

UNDER the easiest conditions, it costs at least $50,000 per mile to build a steam railroad. This would be on flat country, where no great engineering difficulties would be encountered. For distances such as those between Washington and New York, New York and Boston, Boston and Buffalo, Chicago and Springfield, Fort Worth and San Antonio, motor vehicle lines running on concrete roads might very well compete in efficiency with the railroad train in the handling of small package freight and express, in fact, reducing the cost to the public very considerably.

The reasons why this competition could be carried on successfully are practically the same reasons which give the motor 'bus the advantage over the electric car, and in addition there would be greater mobility in the gathering of freight and material, and the avoidance of terminal congestion at both ends of the line.

Some of the advantages of the motor 'bus over the electric carriers are:

1. Greater mobility.
2. Absence of tracks.
3. Continual expansion to meet newly developed needs.
4. Ease with which routing can be shifted without loss of equipment.
5. Mechanical difficulties do not obstruct all following vehicles and interrupt schedule.
6. Possibility of maintaining better schedules and intensive service.
7. Weight of vehicle per passenger less than that of common electric carriers.
8. More efficient for certain kinds of traffic.
9. Makes available for pleasure and business residential thoroughfares closed to the common electric carriers.
10. Acts as feeders to more rapid and long line electric carrier.

It will not be very long before far-sighted capitalists will be placing enormous sums of money in motor vehicle lines of all types. The fact that the motor does the work best and cheapest makes it the logical method of transportation in places where the roads make it possible.

One reason that capital is halting on the threshold of this motorized world is so that it may have time to look around and see in what manner the enormous investment involved in the older methods of transportation can be cared for.

It is conceivable that the owners of horse-drawn stage coaches, horse dealers, farriers, tavern keepers and holders of turnpike stock felt very much the same way some 80 years ago when the puffing, rattling, screeching thing of steel and iron called a train first made its appearance, and thousands of persons can recall the difficulties placed in the way of cable and electric cars by the owners of mule and horse car lines when the more modern method of transportation, the electric car, began to drive the other out of business.

I do not mean to say that motor vehicles will to any great extent take the place of steam railroads, except insofar as they can the more economically move freight and passengers for short hauls, but I do believe that the motor has sounded the death knell of the old-fashioned street car, that the interurban electric line is going to go next and that these *passé* forms of transportation will be laid to rest just as soon as some method can be found to care for the enormous investments involved.

Cities Discarding Horses

Almost every day some city or town in the United States sounds the death knell of the horse, and substitutes for him motor-drawn vehicles. There are still millions of horses used in the country and there will be for many years to come, but motor equipment is gradually forcing them out of the more populous centers. Oakland, California, is one of the latest cities to do this. Oakland has just contracted for motor-driven street-sweeping brooms. In New York and Chicago and Boston and St. Louis the municipalities use motor trucks for public hauling; they use motor-driven street sweepers, and street sprinklers and street squeegees. They are also in even the smallest cities using motor-propelled fire apparatus. Truly the day of the horse is fast going, and the day of the motor car with its hundreds of variations is coming in.

Redden Company Sold

The Auto-Farmer Company, Kankakee, Illinois, has purchased the Redden Truck & Trailer Company, Harvey, Illinois, and the latter plant will be removed to Kankakee and consolidated with the former. The purchase price was said to be $361,000. The lines of motor trucks and trailers previously manufactured by the two companies will be continued.

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Stoughton Wagon Works Enters Truck Field With Three Models

Of importance among recent entrants of the motor truck field is the Stoughton Wagon Company, of Stoughton, Wisconsin. This concern is one of the oldest in freight and farm wagons, and implement manufacture, dating from 1863. It has a capital and surplus of over $1,000,000 and has its own foundry and general machine shops. With ample facilities for getting into motor truck production and a nation-wide reputation, Stoughton Wagon Company adds this enterprise under favoring circumstances. Engineering ability is also provided. Two members of the organization are graduate and experienced engineers from the University of Wisconsin—one mechanical and the other electrical. One of these engineers has had notable success as designer of one of the best known motor trucks.

The officers of the company are: F. J. Vea, president; Henry Beattie, vice president; M. M. J. Vea, treasurer, and W. C. Hegelmeyer, secretary.

Oversize is a characteristic throughout the line, 1-ton, 1½-ton, 3-ton, especially marked in the 1½-ton capacity. Several individual features are included—as for instance in the 1½-ton, a four-universal-joint propeller shaft, impulse starter equipment, a special mounting of the radiator, unusual size of spring bolts, which are lubricated by Brown even travel.

The engine in Model B 1½-ton is the Waukesha BUX, removable head, 4-cylinder with positive forced-feed lubrication and equipped with governor of own manufacture. The unusual torque of this 3¾x 5¼ engine is further increased by the use of a Model M. Stromberg carbureter. The ignition is furnished by an Eiseman, high tension, waterproof, adjustable-spark magneto, equipped with impulse starter, a convenience not ordinarily furnished in a motor truck of this size. A positively driven centrifugal pump is used in connection with a radiator of the fin and tube type. The radiator is of original Stoughton design and is unique. In addition to the usual coil spring under the bolt head, the radiator is directly mounted on two cantaliver springs fastened to the top of the frame, which eliminate entirely the effect of road shock and side strain. The Brown-Lipe selective sliding gear type transmission is used in unit with a multiple disk clutch of own design. The transmission has three speeds forward and one reverse. Sheldon axles and springs of ample size have been selected for each model.

Small High-bid Buyers of Uncle Sam's Motor Trucks to Be Favored

Washington, D. C., Jan. 23.—The amended plan for the sale of equipment and supplies left over from the war, which has lately been announced in statement No. 281 over the signature of the Director of Sales, United States War Department, does not appear to make any striking departure from the system heretofore in vogue for the sale of motor trucks and accessories other than to set aside Thursday of each week for the sale of motor vehicles.

Motor trucks, not being a "household item" to be disposed of via Uncle Sam's chain of 25 retail stores, are affected by the new arrangements only in so far as are all wares that are brought under the readjusted standardized sales system. Offerings of motor trucks will be announced as heretofore (two weeks in advance of the date for closing bids) by means of advertisements in the trade papers and newspapers and by notices sent direct to prospective bidders. A general mailing list for this notification will be maintained at the Washington office and this will be supplemented by a regional mailing list in each "zone." In conversation with the correspondent of POWER WAGON, officials of the Surplus Property Division have laid emphasis on the fact that the bidder for a single motor truck or a small number of motor trucks will invariably be accommodated first, if he has offered a higher price, irrespective of the effort of any quantity bidder who has named a lower price to lay claim to the full complement of motor trucks on the plea that he is the highest bidder for the outfit.

Motor Truck Transportation Opens New Profession Requiring Study

"With the advent of the motor truck a new business or profession has taken its place in American business circles—that of the motor truck traffic manager," says H. P. Branstetter, Chicago Kissel distributer.

"The business of the motor truck traffic manager is to study the area over which his motor trucks operate in the hauling of goods, supplies and material. The object of his job is to deliver and haul goods in the quickest possible time and at the least operating cost per ton-mile. To accomplish this, he should have at his fingertips the shortest and best route to any given destination, the location of terminals and transfer points, the loading and unloading facilities of every business concern and house he does business with. He must even have it figured down as to the exact time a motor truck of a given size, loaded with a certain tonnage, will arrive at a given point.

"The motor truck traffic manager also informs himself regarding mileage between all points—location of garages, service station and supply depots, and should in addition be an expert in the efficient loading and unloading of all kinds of motor truck bodies.

"All of these specific points the motor truck traffic manager has before him as each load is sent out. He occupies the same position as the train dispatcher on a railroad system. By thus operating his motor truck along these lines he does not duplicate area, cutting out immense waste of gasolene and oil and wear on tires. And if the operation is carried out accurately and systematically, all of the motor trucks can be in the home garage at a certain time at the end of the business day."

Cuba is discarding the historic two-wheeled mule carts for the American motor truck in connection with the big sugar industries.

Trucks Fitted with Wells Deliver Live Fish to Consumers in England

Trawler owners at Hull, Fleetwood, North Shields, Aberdeen and other places in England are coöperating in a $5,000,000 organization that will guarantee the delivery of fish direct from the sea to the consumer. It was originally intended, the Yorkshire *Evening Post* states, that the scheme should be a local one, and its initial capital was only $25,000, but it has since developed into a national undertaking and the capital was increased first to $250,000, then to $1,250,000, and now stands at $5,000,000. Hull was the pioneer port of the scheme, but the plan is being extended to other ports along the coast, so that ultimately the whole trawling industry of the country will form one big fish-catching and distributing agency.

The idea grew out of a desire on the part of trawler owners to eliminate waste, to reduce the price of fish to the public, and to guarantee that the public obtain supplies that are fresh in every sense of the word. The scheme of distribution is by means of a fleet of motor "shops" of special construction and design and fitted up with counters that display the fish in a manner similar to that of ordinary retail shops. These motor vans operate from the dock side to the various distributing centers, covering all the streets and thoroughfares in and around the ports.

When the radius of distribution is beyond the capacity of the motor shops, larger lorries will be utilized as well as railway transit. In any case the method of distibution will be govened by speed and the ability to keep the fish fesh. Special wells have been fitted to the shops in which the fish is kept until sold, and special staffs have been engaged to handle the fish in such a manner as will guarantee its reaching the public in a fresh and proper condition.

In outlining the scheme to a newspaper representative, the general manager of Fresh Fish Supplies, Ltd., stated that negotiations are in progress all over the country for establishing a big chain of motor shops operating from all ports. They are already installed in the East Riding of Yorkshire, and the necessary arrangements have been made for opening up in Manchester and other big centers.

Recharges 70 Batteries

The Hobart Brothers Company, of Troy, Ohio, has developed a new outfit capable of recharging 79 batteries at one time. Heretofore, the largest charging set sold under the "HB" trade-mark has been an outfit with a 32-battery capacity, but the enormous increase in the need for first-class battery charging service caused by the increase in the use of automobiles has made it necessary for battery service men to have larger charging capacity to take care of their customers. The new HB outfit has a capacity of from one to seventy 6-volt batteries, or their equivalent in various voltage cells. Five charging panels are furnished, carrying from 1 to 14 batteries on each panel, enabling the service station to give individual attention to batteries in all stages of charge.

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Community-Owned Trucks Winning Favor

Potential Market for Power Wagons Is Extensive Among the 20,000 Co-operative Farmers' Societies of Country

APPROXIMATELY 20,000 farmers' coöperative societies in the United States are potential rural motor express operators, according to a survey recently made by the Firestone Ship-by-Truck Bureau.

"Many farmers hesitate to buy a motor truck because of the cost," says E. Farr, of Akron, Ohio, director of the bureau. "Yet as labor gets scarcer and wages higher, the farmer must use more machines of all kinds on his farm and save the time and wages of a man wherever he can. If after carefully considering possible savings as compared with costs he feels that he can not own a motor truck individually, he can well afford, we believe, to consider a substitute for individual ownership which farmers in some sections are finding highly successful. This substitute is coöperative ownership.

"We find the coöperative idea spreading into the rural motor express field, particularly in those states in which the farmers have been schooled in the principles of cooperation through such associations directing creameries, grain elevators and marketing agencies. Coöperaiton in these instances came as a means of reducing costs. There has been such a wonderful awakening in the last five years regarding its possibilities in this respect that there are today, according to estimates based on good authority, about 20,000 farmers' coöperative associations of one kind or another. The majority are located in New York, Wisconsin, Michigan, Minnesota, the corn belt states, the Dakotas, Nebraska, Kansas and the Pacific Coast states. While most of these associations are not now using the motor truck, we believe a majority will in time add the motor express to their list of activities. We are strongly of this opinion for the reason that it can in so many instances reduce costs of transportation, even as coöperative effort has reduced costs in other ways in the fields already entered by the associations.

"The average farmer if he feels he has need of a motor truck only for going to market might hesitate to buy because he thinks the machine often would be idle. He will more readily lend support to the coöperative motor truck association, made up of himself and ten or fifteen of his neighbors. The power wagon it operates will have few if any idle days. It will be busy doing his work and the work of his little community. It will carry not only his grain and live stock economically, but it also will open up to him new or neglected avenues of profit. As an instance, more than one general farmer has told our investigators that he is earning $50 or more monthly from milk the coöperative association motor truck carries to market. If the motor trucks' services were not available this milk would be used on the farm in some time-consuming or less profitable manner. Whatever loss resulted would of course be felt by the city consumer as well as the farmer.

"It is not possible to determine in many instances the motor truck needs of the individual farmer by the size of his farm or the kind of farming he is engaged in. The kind of farming practiced determines the needs of the farmer, however, more often than does the size of the farm. Generally speaking, the average farmer engaged exclusively in dairy work or in the work of the truck gardener will want a small machine of his own, while the average grain or live stock farmer may feel that the coöperative motor truck line can serve his marketing needs more economically."

Federal Bureaus Battle Congress On Rights to Test Motor Trucks

Washington, D. C., Jan. 23.—Motor trucks and trailers will come within the jurisdiction of the Bureau of Farm Engineering which it is sought to establish in the United States Department of Agriculture if congress can be persuaded to allot money for this new cog in the government machine. There is nothing new in the proposal set forth in the bill (H. R. 11,306) which Representative Anderson introduced at the request of the National Association of Automotive and Agricultural Engineers. The Department of Agriculture has endeavored for a number of years, to persuade congress to authorize the expansion of its Bureau of Rural Engineering (an annex of the Office of Public Roads) into a full-fledged clearing house of agricultural engineering activities that would consolidate under one head all the activities with reference to farm power. It continues to nag congress on this need, as witness an "estimate" of $100,000 for an investigation of farm power included in the schedule of appropriations which congress has been asked to approve for the year 1921.

All requests for funds to initiate new projects are finding hard sledding just now owing to the desire at the capital to cut expenses to avoid the necessity of another bond issue, but this proposal to inaugurate a comprehensive engineering bureau in the agricultural department is due to encounter especial obstacles from the fact that a number of influential members of congress hold to the opinion that the testing of motor trucks, tractors, etc., to fix standard horse-power ratings, etc., is consistently a job for the United States Bureau of Standards and not for the Agricultural Department.

A. G. Ripberger, formerly of the engineering staff of the Illinois Steel Company at Gary, Indiana, has become chief engineer for the steel and tube department of the main plant of the Timken Roller Bearing Company at Canton, Ohio.

Finds Economy of Motor Truck Over Railways in 1,700,000-Pound Haul

The old story, in which the shoemaker's children were the ones who went barefoot, finds no parallel in the building and use of motor trucks and their parts and accessories. In fact, the various divisions of the automotive industry have always been consistent users of the industry's products. A conspicuous example of this is the extensive use of motor trucks by large concerns in the motor and accessory branch of the industry.

"In our own experience," says President Christian Girl, of the Standard Parts Company, "we may have been influenced in the first instance by the thought that we are duty bound to work for the business in which our own goods finds their market; but we have been no less persuaded, as we have studied costs and performance, that motor truck shipping, for instance, is indispensable to our best efforts.

"One of a number of experiences will illustrate the point. Against a carload freight rate of 7½ cents, a less-than-carload rate of 19 cents and express rate of 82 cents per hundred weight for the 60-mile haul between our plants in Canton, Ohio, and our factories in Cleveland, we decided to use motor truck haulage at a cost of 50 cents per hundred weight. Yet our records show that we actually save money, and this notwithstanding that we would generally obtain the carlot rate if we shipped by rail.

"The difference in labor and time and loading and unloading convenience more than compensates for the difference in rates. The result is that the public motor truck lines have handled for us between these two points 1,700,000 pounds of freight in the past six months. I personally believe that there still exists a real lack of appreciation of the remarkable economy of door-to-door delivery—an appreciation which will develop completely only as the public gains in experience."

Acason Sells Big Fleet

A large individual fleet order received from the South has just been accepted by the Acason Motor Truck Company, of Detroit. This firm now has the contract for furnishing a fleet of motor trucks to the Atlantic Salvage Company, the concern which is purchasing army camps and equipment from the war department.

J. C. Bonner, of the Bonner-Acason Company, Newport News, Virginia, who negotiated the contract with the Atlantic Salvage Company, visited the Acason factory and arranged the details for quick shipment of this fleet. It will be known as the "Yellow Fleet" and will be in service at points where the Atlantic Salvage Company operates. The fleet will be composed of motor trucks of 2½-tons capacity. The creditable performance of Acason power wagons in government service at the Hog Island shipyard was a big factor in making the selection of machines to be used by the Atlantic Salvage Company.

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Chicago Truck Show Reveals Hungry Market for 1920 Production

Most Conservative Manufacturers Admit Their Estimates for Year's Demand for Power Wagons Will, from Present Indications, Be in Excess of Any Possible Supply

THE attendance of distributers, dealers and the public at the exhibits of the more than sixty-five motor wagon manufacturers at the show stamped the 1920 Chicago National Motor Truck Show as the greatest in the history of the industry.

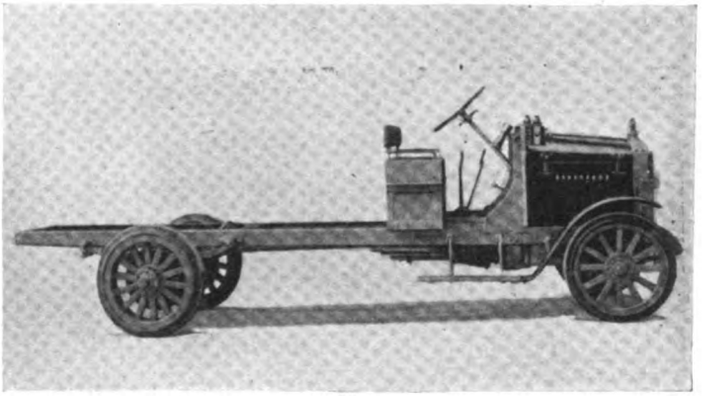
A careful canvass of hotel headquarters of those exhibiting and those others not so fortunate developed the fact that the show visitors were on hand to do business—and they did to an extent far in advance of any previous Chicago show records.

No matter to what extent one may discount the optimistic forecasts of even the conservative factory executive, there is no doubt that in 1920 more motor wagons will be manufactured, sold and placed in domestic service than in any previous year. The foresighted distributer and dealer who was not in attendance at either New York or Chicago shows should need very little urging to contract now for all of his possible requirements.

The executives of those motor truck manufacturers who are well entrenched in the industry are given to careful study of national conditions. They, together with distributers and dealers from evey part of the country, are all operating on the assumption that the demand for motor wagons is going to increase as the year goes on. The majority is usually right. With the parts makers all operating to capacity to fill present needs rather inadequately, everything points to the fact that the dealer who has closely estimated the sales possibilities of his territory and contracts accordingly is going to have his most prosperous year.

In addition to offering the following illustrations and descriptions of some of those models shown at Chicago, we would mention the fact that one of the most noticeable features was the exhibition of so many models of light load capacity equipped with pneumatic tires to operate at high speed.

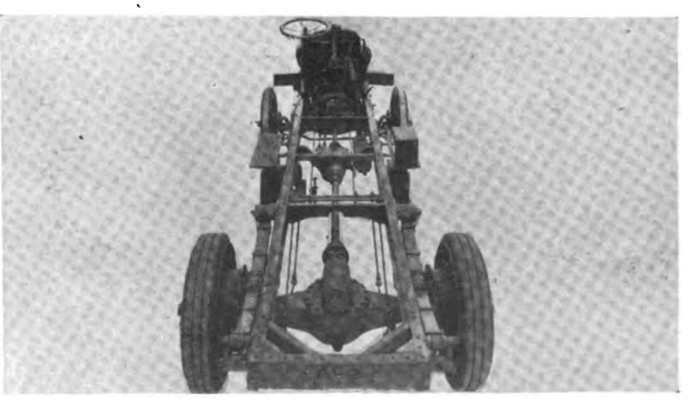
ACASON.—Aside from the fact that the Model L 3½-ton Acason is now equipped with Smith iron wheels instead of the artillery type wood wheels formerly used and that a few minor adjustments have been made in some of the units, there are no radical changes contemplated by the Acason Motor Truck Co. in the design or construction of the Acason line of 1-, 1½-, 2½-, 3½- and 5-ton models for 1920. The heavy duty long stroke Waukesha motor is used on all models, as are the Timken-David Brown worm-drive full-floating rear axle, the Shebler carbureter, Eisemann ignition and other high quality units. The Fuller selective sliding gear transmission with three speeds forward and one reverse is used on the 1- and 1½-ton models—the Cotta sliding dogs with gears in constant mesh transmission is used on the 2½-, 3½- and 5-ton models. Cooling is obtained by fan and water pump, the radiator being the built-up type with detachable core, protected by special design radiator guard. All speed and brake levers are mounted in the center of the chassis and the chassis price includes Boyce motormeter, three oil lamps, mechanical horn, jack, oil can and complete set of tools.



Acason 2½-ton.

✣

ACE.—The American Motor Truck Company of Newark, Ohio, is manufacturing a ¾-1-ton, a 1½-2-ton, a 2½-3-ton, and a 3½-4-ton motor truck. The photograph of the 2½-ton chassis basically is representative of all Ace models. In other words, the basic design and principle of the various models is founded on the construction of the 2½-ton chassis and a great many of the parts, castings, etc., are interchangeable. In building Ace motor trucks, two ideas are being carried through, to meet the present and future motor truck markets. First, quality. The American company's claim to building highest grade motor trucks is based on the fact that the company engineered and designed its product after years of investigation, experience, comparisons, and by taking advantage of the mistakes made by other manufacturers. In building this product, the thought of price is secondary. The finest quality of material and workmanship is purchased, so that every detail of the product is engineered to unity and is as fine as modern ingenuity can make it. The second point is: The fully equipped motor truck. The Ace is a pioneer in this respect. The motor truck of the present, and of the future, must have an all-weather cab, electric lights, electric starter, steel bumper, radiator guard, steel wheels, odometer, electric horn, and all those other features which are essential to comfort, convenience, utility, economy and service.



Ace, 3½-ton model.

✣

ACME.—The Acme Motor Truck Company, Cadillac, Michigan, has recently announced and put into production a new model. This will be known as model "F," capacity 1½-tons. The designing of this new model and the selection of its units were based on a careful analysis of the field and what is required of a 1½-ton motor truck. This new Acme model attains the same high standard found in all of the Acme models as to choice of units, design, assembly and proper balance. No effort has heretofore been made to produce an Acme 1½-ton motor truck owing to a Timken-Detroit 1½-ton axle not being manufactured. Since the announcement of Timken axle 6460, this being strictly a 1½-ton motor truck axle, it has made

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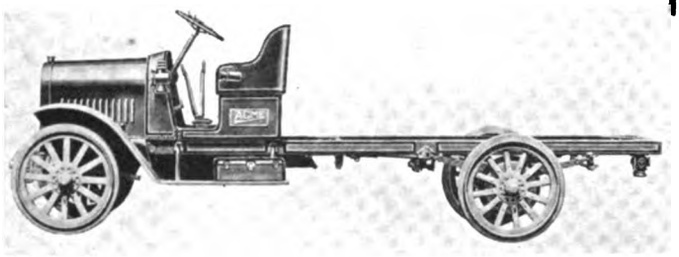
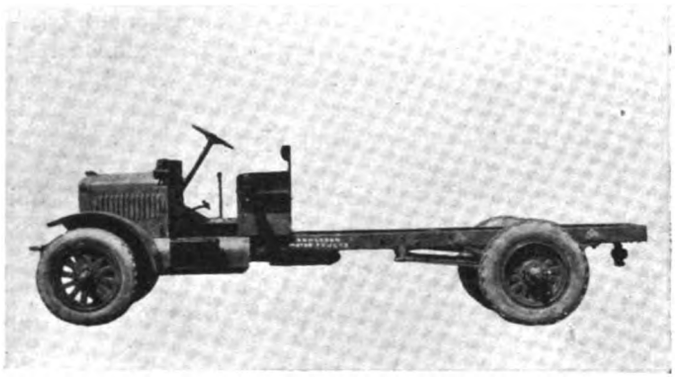
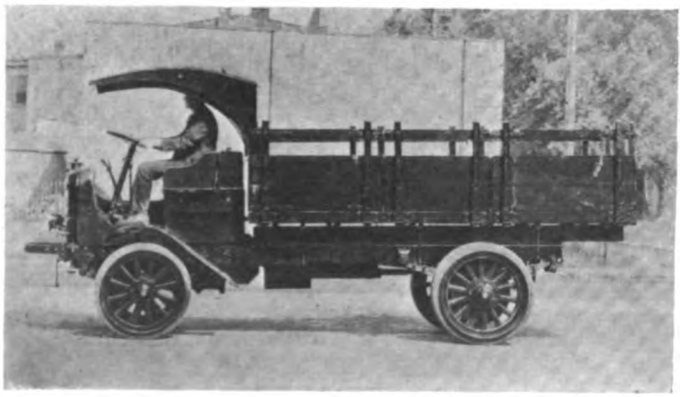


Acme F, 1½-ton.



Armleder.

Atterbury.



Autocar heavy duty.

it possible for the Acme company to produce this new model and offer a well-balanced 1½-ton motor truck. Model "F" has a chassis rating including weight of body of 4,500 pounds; maximum on rear axle 80 per centum of body weight and load; wheelbase 141 inches; chassis length 208 inches over all; loading space 120 inches; 58-inch tread, and Continental Red Seal motor developing 35 h.p. While this model was designed primarily for the farm field, it is proving a favorite in all lines where a motor truck a little heavier than the 1-ton and not quite so heavy as the 2-ton is desired.

✣

ARMLEDER.—Armleder Motor Trucks have in their construction well-known high-grade standard units. These alone, however, do not make a good truck; they only help to do it. These machines embrace six patented features owned exclusively by the company, and these, together with other striking mechanical construction features, combining simplicity, quick replacement and interchangeability of parts, are what make the Armleder a high-grade motor truck. It is these features, combined with the finest materials and workmanship, that raise the Armleder from an ordinarily good motor truck to a superfine one. They add to the efficiency of the motor truck and to its value. Armleder patented springs shorten from 12 to 17 inches under load, depending on the weight of the load, thereby adjusting themselves to the weight they must carry, giving flexibility and easy riding qualities. There are no shackles or shackle bolts. About 48 wearing parts are done away with. They are made of vanadium steel in every leaf and guaranteed never to break.

✣

ATTERBURY.—Well known standard parts such as Continental engines, Long radiators, Eisemann magnetos, Zenith carbureters, Brown-Lipe clutches and transmissions, Timken axles, Gemmer steering gears and Savage frames will continue to feature Atterbury construction throughout the coming year. This worm-drive machine which is made in 1½-, 2-, 3½-, and 5-ton models will be on exhibit at the Chicago show.

✣

AUTOCAR.—The new heavy-duty Autocar (Model XXVI Y) which has just been announced, is being exhibited at the National Show at Chicago. This new heavy-duty Autocar retains the destinctive features of the Autocar design including the short wheelbase and double reduction gear drive. The capacity is 18,000 pounds over all (chassis, body and load). It is equipped with a 4-cylinder motor, removable head, 4¼-inch bore, 5½-inch stroke. The crankshaft is mounted on annular ball-bearings and the horse power is 28.9 according to the National Automobile Chamber of Commerce rating. The wheelbase of the motor truck is 120 inches. The length over all from the front of the bumper to the end of the frame is 204 inches; the width over all to the outside of the hub caps is 81¼ inches; the tread is 63 inches; the length of the frame back of the seat is 124 inches and the turning circle is 42 inches.

✣

BETHLEHEM.—"The addition of the ¾-ton Dependable Delivery to the Bethlehem line," says Roy S. Davey, General Sales Manager of the Bethlehem Motors Corporation, Allentown, Pennsylvania, "gives every butcher, baker, retail grocer, department store owner, florist, milkman, farmer—anyone whose business requires speedy, reliable delivery, an edge on his competitor. The Dependable Delivery is a real motor truck built according to motor truck requirements by motor truck manufacturers for motor truck purposes. It is not an adapted pleasure vehicle. The Bethlehem is neither overbuilt to justify a price nor underbuilt to meet a price. It has all the power, strength and endurance of the bigger Bethlehem models. Its electric lighting and starting system means safety and economy, for the use to which a light delivery motor truck is put frequently calls for numerous stops and night work. If a driver can step on a button instead of turning over the motor by hand, he'll shut off the power whenever he stops—the advantage of powerful headlights needs no explanation. The starting feature alone is a guarantee of low operating cost—every merchant's aim. And add to low operating cost, low repair cost and reasonable initial cost. Standard specifications are: Electric lighting, electric starting. An especially designed Bethlehem motor Bosch magneto equipped. Bronze backed motor bearings. Spicer drive shaft. Bevel-gear rear axle. Ross steering-gear. Chrome vanadium steel springs. Semi-flexible frame. Meyers magazine oiling system. Cord pneumatic tires, 35 by 4½ front, 35 by 5 rear.

✣

CLYDESDALE.—There have been no changes of any importance in the design of the Clydesdale motor trucks. The present models remain the same in 1920 as they were in 1919 with the exception of a few minor refinements. Undoubtedly much of the success of the present Clydesdale models has been due to that exclusive Clydesdale feature—The "Driver under the Hood." The engine, clutch, transmission, propeller shaft and rear axle have been relieved of a tremendous number of strains that cannot be avoided in the ordinary motor truck. Every motor truck owner realizes that he must expect a certain amount of engine trouble, due to the strains of engine racing or laboring, and undoubtedly appreciates the fact that making racing and laboring impossible will eliminate much of the troubles in engine and other propelled mechanism. The Clydesdale "Driver under the Hood" automatically throttles the engine down when going down a grade or at any other time when load is relieved. The most severe tests have been made and it has been found impossible to race the Clydesdale engine. Even with the throttle fully advanced and the machine running at full speed, suddenly depressing the clutch, merely slows up the motor—it can not race.

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DEFIANCE.—The Turnbull Motor Truck and Wagon Company, of Defiance, Ohio, has incorporated a number of improvements and refinements in its 1920 2-ton model which is of the internal gear drive type. Continental engine, Eisemann magneto, Stromberg carbureter, Borg and Beck clutch, Grant-Lees transmission, Torbensen axle, Standard springs, Ditwiller steering-gear and Detroit frames feature this year's machine.

✣

DENBY.—The Denby Motor Truck Company, of Detroit, will continue its 1-, 2-, 2½-, 3½-, and 5-ton models during 1920. This well known make of motor truck with its internal gear drive is built up such standard parts as Continental engine, Eisemann magneto, Stromberg carbureter, Fuller clutch and transmission, Russell axle, Detroit springs, Gemmer steering-gear and Detroit frame.

✣

DEPENDABLE.—The Dependable Truck & Tractor Company, Galesburg, Illinois, is manufacturing motor trucks of two capacities —1½- and 2½-tons. The various parts have been assembled to permit of ready access for adjustment when necessary. An unusual feature in the make-up of these machines is a device for cooling the oil—called the Viscometer. The engines used in Dependable motor trucks are of Buda make, having a bore and stroke of 3¾ by 5¼ inches and 4¼ by 5½ inches, for the 1½-ton and 2½-ton jobs, respectively. The power of the engine is transmitted through a multiple dry disk clutch and Fuller transmission. Final drive is through a Wisconsin worm drive axle. Ignition is through a Dixie high-tension magneto with an automatic impulse starter. A Zenith carbureter, which receives its fuel from a Stewart vacuum tank, is used. The radiator used is of heavy-duty design and very large in size. It is inclosed in a cast iron shell mounted on two large half oval springs, designed to absorb shock, thus preventing the solder from crystallizing and causing the radiator to leak. The springs used are made of alloy steel and are guaranteed to last the life of the motor truck. They are bronze-bushed and use extra large nickel-steel ground pins, as this is considered the best combination for wearing surface. Steering is through a Ross gear with steering wheel 20 inches diameter. Other standard units used in this assembly are Boyce motormeter, Pierce governor, Goodyear, Firestone or Goodrich tires; 16-gage crowned fenders with steel running board and pressed steel tool box, extra large and well proportioned seat. The equipment includes a hand-operated horn, truck seat and dash with lazy back, tools, jack, oil can and tool box. The optional equipment consists of a cab, odometer, starting and lighting and battery, pneumatic tires and power tire pump, hand and power hoists and bodies.

✣

DIAMOND T.—This well known worm-driven machine of Western manufacture will be shown at the New York show in five models: 1-, 1½-, 2-, 3½-, and 5-ton. Throughout 1920 Continental engines, Bosch magnetos, Stromberg carbureters, Brown-Lipe clutches and transmissions, Timken axles, Gemmer steering-gears and Smith frames will feature the sturdy construction of Diamond T's.

✣

DODGE.—The 1,000-pound delivery car made by Dodge Brothers, of Detroit, will be featured at the Chicago show. Power is furnished this machine by a special engine made by the makers of the car. Other parts are: Stewart carbureter, Detroit springs, Northeast battery ignition, own steering-gear. The final drive is bevel gear.

✣

DORRIS.—There is no change in either of the two Dorris models for 1920, except that the 2-ton chassis will be equipped with steel wheels instead of wooden ones. The power plant and other mechanical parts have proved so satisfactory in the past year that no changes have been found necessary. The 3½-ton machine is a new model brought out in 1919, and has not been illustrated to any great extent. Both of these models will be shown at the Chicago Motor Truck Show as well as a 2-ton chassis, with pneumatic tires. An increase in the demand for pneumatic motor truck equipment, has been noted, a number of orders from the West as well as other sections having been received. Where pneumatic equipment is required, a 2-cylinder heavy duty Kellogg pump mounted on a transmission case is furnished.

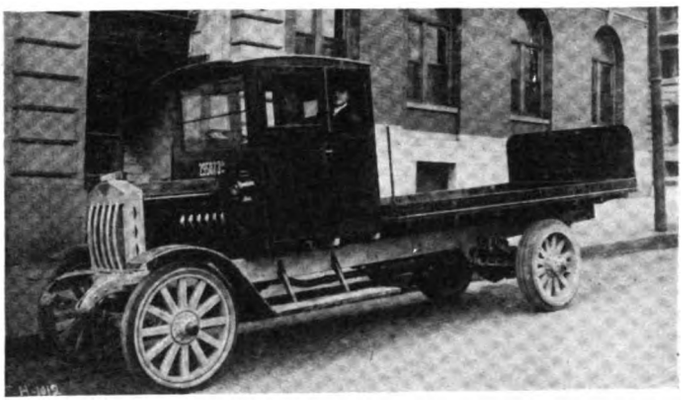
✣

FEDERAL.—The Federal Motor Truck Company, of Detroit, making five models, 1-, 1½-, 2-, 3½- and 5-ton, will be represented at the Chicago show. This popular machine has won favor through the efficient performance of its many standard parts, which include: Continental engine, Eisemann magneto, Zenith carbureter, Berg & Beck clutch, Timken axle, Mather springs and Gemmer steering-gear.

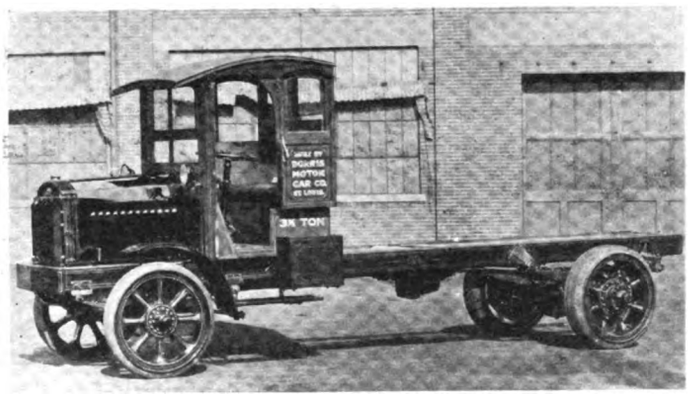
✣

FRUEHAUF.—Fruehauf reversible truck trailers are built on the circle steer or fifth wheel principle with the load carried on dead square axles. This principle has been applied to trailer construction by the Fruehauf Trailer Company to a degree heretofore undeveloped. The maximum axle strength is obtained by this construction which is impossible with the complications of the knuckle steer type of automotive design. Fruehauf trailers track true with the motor truck, eliminating all possibility of "snaking." Turning

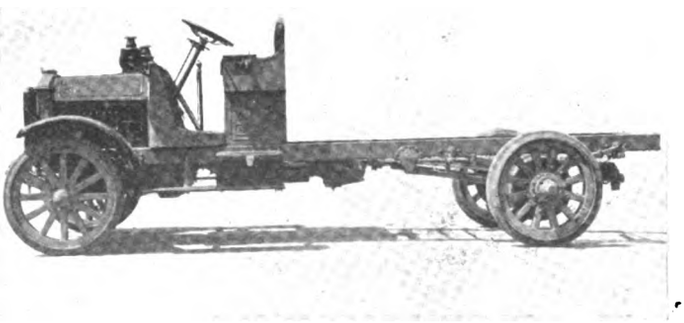
Bethlehem, ¾-ton.



Clydesdale.



Dorris 3½-ton.



Federal, Model TE, 1½-ton.

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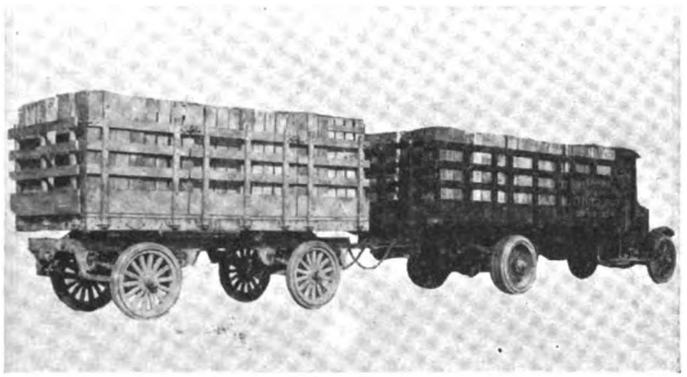
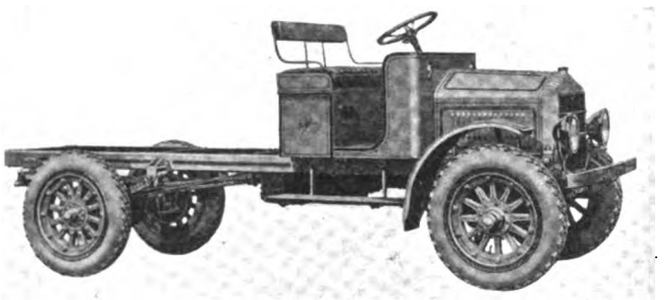


Freuhauf trailer.



Garford, Model 25, 1¼-ton.

Gary 2½-ton.

Gramm-Bernstein.

is made easy, owing to especially designed roller bearing circles and right angle turns are possible. Sturdiness of construction is the principle on which the trailers are built. The springs are relieved of all duty, except to cushion the load, as the pull is exerted through radius-rods. Springs are placed close to the wheels which prevents swaying or rocking when travelling at high speed. The frame is built of heavy channel steel, thoroughly gussetted, providing rigidity and freedom from any possibility of "weaving" or twisting under capacity loads. Stake pockets are hot riveted to the frame. Flooring is built into the frame, increasing its strength. The locking devices on both gears are simple, positive and easy to operate. All models are equipped with Timken roller bearings throughout.

✣

GARFORD.—The Garford Motor Truck Company, of Lima Ohio, during 1920 will concentrate upon the building of five models, namely, the 1¼-ton, 2-ton, 3½-ton, designed with the motor out in front, the 3½-ton of short wheelbase, designed with the motor under the cab, and the 5-ton. The 1¼-ton machine and the 3½-ton model with the motor placed in front are recent additions to the Garford line. The former is designed to meet all the requirements of light hauling in the industrial, commercial and farm fields. It is particularly adapted to work on the farm and the demand for it from this source alone has far exceeded its production to date. While virtually it is a 1¼-ton machine, it embraces the additional strength obtainable in a motor truck of 1½-ton capacity. It has a 1½-ton worm-drive Timken axle, a 1½-ton frame and its transmission is of the 1½-ton type. It is equipped with a four-cylinder "L" head motor 3¾ by 5⅛ inches. The new Garford 3½-ton model fills a popular demand for a motor truck of medium heavy capacity, low initial cost and capable of increased economy in both gasolene consumption and cost of maintenance. The 1¼-ton model, although but a few months old, has assumed a place of leadership in the extensive Garford line. The demand from the farm field alone has to date exceeded its production. The pneumatic tires are extra equipment.

✣

GARY.—The Gary Motor Truck Company of Gary, Indiana, continues its complete line of 1-, 1½-, 2½-, 3½-, and 5-ton motor trucks in eight different sizes without much change throughout 1920. Frank Dawson, designer and builder of the Gary has made numerous refinements and improvements, but all the principal units, such as Buda, Timken, Parish & Bingham, Brown-Lipe, Spicer, etc., remain. Mr. Dawson has increased the capacity of his plant in Gary over 400 per centum since last March, and is running up to capacity.

✣

GRAMM-BERNSTEIN.—The new 5-ton Gramm-Bernstein illustrated herewith is the basis of their new line of worm-drive motor trucks, which embraces 1½-, 2-, 2½-, 3½- and 5-ton capacities. The line includes also an internal-gear model of 1½-ton size. Of these the 2½-, 3½- and 5-ton are driven by the Liberty truck-type motor with removable cylinder heads. All worm-drive models are sold completely equipped, in accordance with the Gramm-Bernstein policy, with cab and ventilating windshield; radiator guard; motometer; radiator shutters; army towing hooks; hubodometer; electric side, dash and tail lights; metal license brackets front and rear; and spring trailer draw-bar with locking device at rear end. In addition they carry the other Gramm-Bernstein characteristics, such as the radiator shroud and shutter, patented wick oilers on all spring bolts and Gramm patented constant mesh transmission, with pad for attaching Gramm power take-off device. The 1½-ton internal gear has been added to the line to meet the demand for a strictly high-grade, well-engineered, light motor truck at a popular price. It is assembled from proved units, sizes of which are of ample dimensions.

✣

HUFFMAN—The Huffman motor truck, made in two models "C" and "B," 2,000 to 5,500 pounds' capacity, is built up of all standard parts including Continental engine, Dixie magneto, Zenith carbureter, Fuller clutch and transmission, Torbensen axle in Model C and Standard axle in the worm-driven Model B. Perfection springs are standard equipment.

✣

INDIANA.—This machine, which is made by The Indiana Truck Corporation, Marion, Indiana, will be represented at the Chicago show in five sizes: 1-, 1½-, 2-, 3½- and 5-ton. In this line the 1- and 5-ton models are equipped with Waukesha engines, while the other models carry Rutenber engines. Other standard parts in the Indiana models are Eisemann magneto, Stromberg carburetor, Borg & Beck clutch, Brown-Lipe transmission, Sheldon axles and Wohlrab steering-gear.

✣

INTERNATIONAL.—The illustration shows the new 3½-ton Model L International Motor Truck, 160-inch wheelbase. This model is also manufactured with 185-inch wheelbase, which thus gives two new sizes to the International line. Model L is built along the same general lines of the other International models—8-inch pressed steel channel frame, four-cylinder, valve-in-head, water-cooled engine, dash radiator and sloping hood, multiple-disk clutch, four speed, selective transmission, International type internal gear final drive. International type auxiliary side springs. Solid tires are regular equipment, 36 by 5 front, 40 by 10 rear. All sizes of International motor trucks except the Model L sizes are now built regularly with standard 56-inch tread front and rear. Model G is also made with 61-inch tread, rear. Models G (2-ton), F (1-ton), and H (¾-ton) are now equipped with International type auxiliary side springs which is the spring construction always used on Model K (1½-ton)

(Continued on page 58)

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Read how the manager of THE HOWARD REFRACTORIES COMPANY, Dorsey, Maryland, saved contracts by keeping his firm's busy trucks eternally on the job.

"BUT for 'NOBBY CORD' PNEUMATIC TIRES our trucks would have been useless last winter, as solid tire equipment invariably stuck in the mud before reaching our plant."

"Since July, 1918, 'NOBBIES' have served us under capacity loads of heavy fire brick and weighty materials and to date a slight nail puncture is the only sign of depreciation."

'NOBBY CORDS' mean—less operating expense — increased speed — reduction in mechanical repairs and vibrations—decrease in gasoline consumption—decrease in oil consumption—greater traction—elimination of breakages—less depreciation.

"Nobby Cords" Save in Every Phase of Truck Operation

Please mention "Power Wagon" when writing to advertisers

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48
of the First Fifty

Pierce-Arrow trucks are still running after 8 years. Their initial cost has been distributed over 8 years. Each added year they run it will spread further.

Buy reliability. Every day a truck is off the job it is costing money and losing earnings. Your truck should last for years and earn profits every mile it runs.

THE PIERCE-ARROW MOTOR CAR COMPANY, Buffalo, N. Y.

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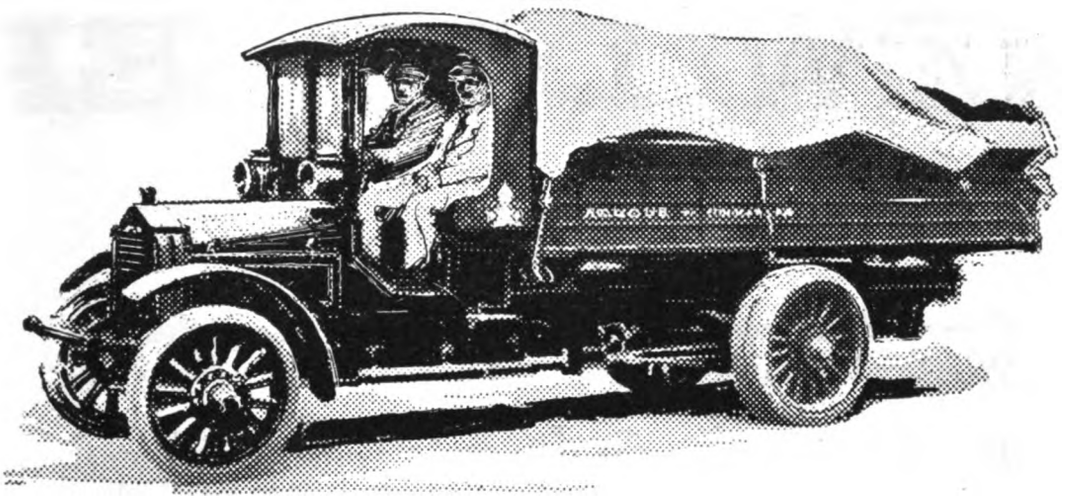

No. 8 of the First Fifty is operated by Armour & Company in Chicago. Used for short-haul city deliveries, which require barely thirty miles a day; it has traveled only 75,000 miles.

Its satisfactory service is proved by the fact that it is one of 17 Pierce-Arrows which have been bought by Armour for similar work in Chicago. These additional trucks all embody the same principles. Each is capable of the same unfailing service.

Pierce Arrow

Delivers more work in a given time.

Loses less time on the job and off the job.

Costs less to operate and less to maintain.

Lasts longer, depreciates less and commands a higher resale price at all times.

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NEW DEALERS

Several months ago we pointed out to the trade that the Winther organization was expanding in every direction.

The executive force was enlarged. Some of the most prominent men in the industry have joined the Winther organization.

Production facilities were also added to. We made up our minds to go after business in a two-fisted manner, and the results certainly show that we are on the right track.

Business was never better. New dealers are joining our dealer organization every day.

They are beginning to see the light; starting to realize that the name "Winther" on a truck is a name that stands for something tangible; something they can "cash in" on.

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EVERY DAY

Also when we explain the broad, fair and square way we intend treating our dealers they are ready to talk business.

We want every Winther dealer to make money. Our plan helps him in every possible way.

We want to talk to you. Let us show you how Winther business is expanding. Let us show you how you can make monev as a direct result of our expansion.

The good territory is going rapidly. Better get in touch with us at once.

1½ to 7 ton rear driven.
1½, 2½ and 3½ ton four wheel drives.

WINTHER MOTOR TRUCK CO.
Kenosha, Wis.

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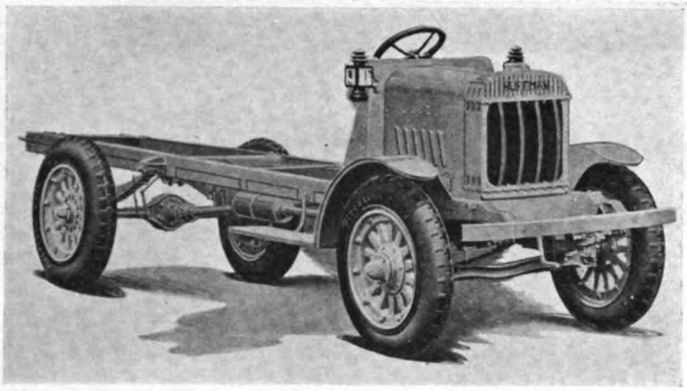
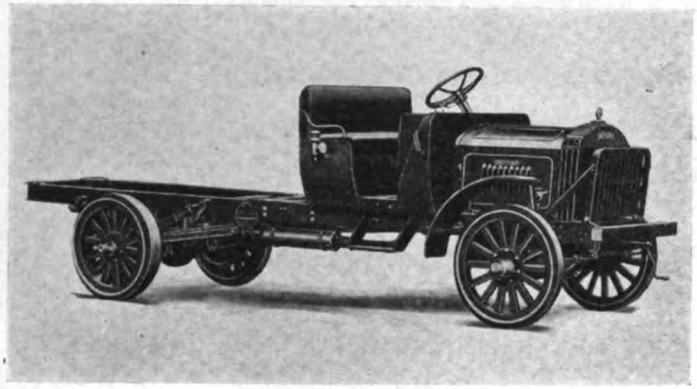
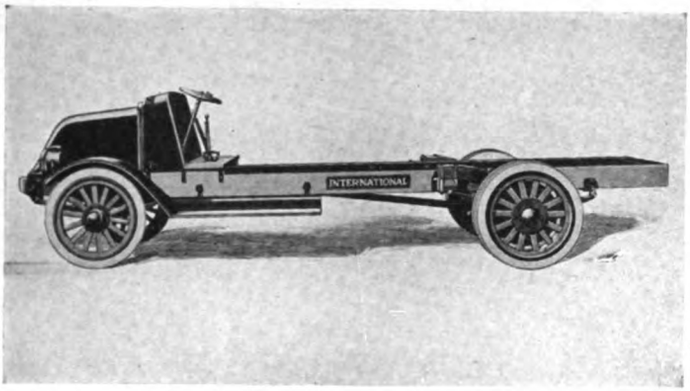


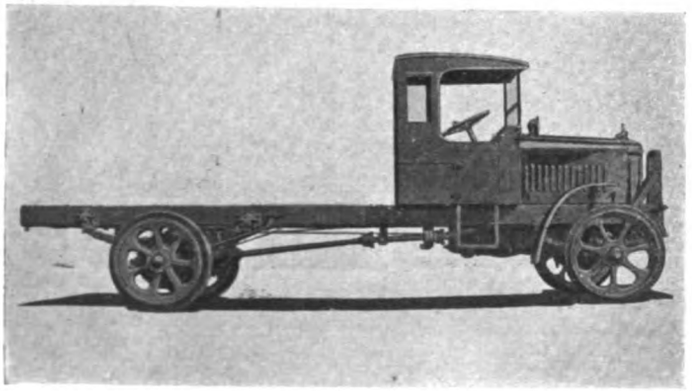
Huffman.



Indiana.



International, 3½-ton.



Jumbo, 3½-ton.

and on the new Model L. The dash design of Models F and H has been changed to the cowl type and altered slightly to provide for dash gasolene tanks. This standardizes the design of the entire line of International motor trucks into one general uniform type of construction, and all important International features are now embodied in each International model.

✣

JUMBO.—The careful selection of material and more complete equipment which is going into motor trucks is clearly brought out in the three models of the Jumbo motor truck manufactured by the Nelson Motor Truck Company, Saginaw, Michigan. All models are Clark internal gear driven. A large number of newly designed features have been incorporated in these motor trucks. One of particular interest being the straight line drive which is secured by mounting the engine at an angle of 2 degrees 20 minutes on its base, thus allowing the crank shaft and the propeller shaft to be in straight line when the machine is under load. The mounting of the engine has been worked out with the engineers of the Buda company, which motor is used in all Jumbo models. Another feature of unusual interest in the 3½-ton model is the 4-speed Brown-Lipe transmission, equipped with special apertures for power take-off installation. All models are equipped with radiator shutters. In heavy duty models a spring draw-bar attachment is standard equipment for the purpose of hauling trailers. Throughout, all Jumbos are lubricated by the Alemite grease gun system. A steel cab for the driver is standard equipment with the chassis. The Jumbo line includes motor trucks having 3000-, 4000-, 5000-, 6000-, 7000- and 8000 pounds capacity. Solid or pneumatic tire equipment is optional. All models are equipped with hub odometer.

✣

KISSEL.—The Kissel ¾- to 1-ton model is for retailers and merchants who want a quick delivery machine for speedy work in city and suburban districts; for manufacturers and wholesalers who want a light motor truck as auxiliary to their heavier models; for farmers who want a reliable light delivery machine equipped with a good loading space and ability to carry loads at a good rate of speed and for owners who require motor trucks for emergency runs. The 1½-ton size is for those who demand a machine larger than the light delivery car and still want a speedy vehicle for delivery service. Then there are those concerns that have use for the 2- and 2½-ton models such as local transportation and express companies, rural motor express, road builders, contractors, excavators, municipal work, farmers, manufacturers, wholesalers, coal and wood dealers. There are still other concerns that require a model around the 3½-ton size, such as contractors, road builders, express and moving companies that specialize on heavy haulage work, as well as all those industries and manufacturers that require a powerful motor truck with the capacity and loading space suitable for work in connection for hauling lumber, stone, iron, brick, machinery, gravel, cement, materials for street paving, bridge work, as well as street sprinkling, flushing and oiling units. All these models are to be found in the Kissel line.

✣

MACCAR.—There has been added to the Maccar line this year a Model "S" 1-ton capacity chassis. With this chassis there is a complete line of models, ranging as follows: 1-ton, 1½-ton, 2½-ton, 3½-ton and 5½-ton. Standard parts for the Maccar Model "S" are as follows: Continental engine, Stromberg carburetor, Eisemann magneto, Brown-Lipe clutch and transmission, Spicer joints and shaft, Timken axle, Ross steering gear, Parish frame and Merrill springs. The motor, clutch, transmission, radiator, pump, magneto, carburetor, dash, toe boards, brake and foot pedals, steering gear and all spark and throttle connections are assembled in one cradle and as a unit mounted into the frame. By removing six nuts and disconnecting drive shaft brake and fuel connections, it can be removed and another unit substituted in less than thirty minutes, without disturbing the driver's seat. This feature, which is the most substantial and flexible in motor trucks, is practically a guarantee of service every day in the year.

✣

MASTER.—The various models of Master motor trucks have proved so satisfactory that few changes will be seen during 1920. The only changes so far decided upon are, first, the standardization on Spicer universal joints throughout the entire line; and second, the adoption of a new steel dash on all models. The standard units which have characterized Master construction in the past will be seen in the 1920 chassis. These include Buda heavy-duty motors, Timken axles and bearings, Brown-Lipe clutches and transmissions, Ross steering gears, Parish & Bingham pressed steel frames, and Detroit Steel Products Company silico-manganese steel springs. It is Master policy to bring out improvements from time to time as they seem to be justified, rather than to hold them back and show entirely new models at the beginning of the year. For this reason, a number of small improvements now contemplated will probably be seen during the early spring months rather than at the January shows. These improvements will not materially affect the standard Master design or construction. A complete line, including 1½-, 2-, 3½- and 5-ton models, also a 6-ton road tractor, is now produced, and a 7½-ton model will probably be brought out within the next few months. The chassis shown here is characteristic of Master design.

✣

MAXWELL.—The chassis is furnished with complete dash fittings, upholstered driver's seat of full width; electric horn; generator; 80 ampere hour storage battery; and a full set of tools. The two great improvements evident in the motor this season are the "hot spot" and the "ram's horn" manifold. The "hot spot" cracks up the low-grade commercial gasolene into hot, dry gas instead of allowing it to pass in a raw state to the cylinders, while the "ram's horn" manifold is scientifically designed to take care of the correct distributor of the gas mixture after it has been prepared by the "hot spot." These features are equally important at all seasons

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of the year, but the benefits are more noticeable in cold weather because "hot spot" makes it possible for the motor to operate smoothly and powerfully without the slightest delay even in the coldest winter weather. Maxwell service records show that after more than 14,000 of these motor trucks had been in service for periods varying from a few months to 2½ years that they average 99.99 per centum perfect, a record based on the complaints and the quantity of repair parts required to keep them in good condition.

✣

NASH.—Of special interest to truck owners and users is the information that the Nash line of motor trucks is built almost entirely in the giant Nash factory. Both the materials and workmanship entering into Nash motor trucks are regulated to Nash standards. All the materials used are specified and tested carefully in the Nash laboratories, and a rigid inspection system tolerates no fluctuation from the high standards upon which has been builded the Nash reputation. Not only is every part of a Nash motor truck given a thorough test when completed, but the various parts are inspected again and again in the course of manufacture. The powerful high speed motor of the Nash 1-ton and 2-ton motor trucks, in particular, receives unusually critical attention. It is the most vital part of the machine and is built complete in the Nash factory. The country-wide "good-will" which Nash motor trucks have created in owner service is largely dependent upon these "manufactured" qualities which maintain the motor trucks in service day after day over a long period of time at a minimum cost per ton mile.

✣

OLDSMOBILE.—The Oldsmobile Economy Truck was designed and built with the idea in mind of furnishing dependable and inexpensive transportation for many different lines of activity; serving equally well the merchant, the tradesman, the producer and the shipper. While sturdy and strong enough to carry capacity loads in work heretofore done by heavier machines, it is sufficiently light and speedy for city service. The standard body is express type, with top and side curtains. A standard metal cab is also furnished and a large variety of bodies can be mounted behind this cab. Chassis only is also supplied. Large pneumatic cord tires 35 by 5 are regular equipment, and Oldsmobile completeness is typified by regularly equipping the Economy Truck with an electric system furnishing current for ignition, starting, lighting and warning. The motor is of the valve-in-head type, developing over 40 horse-powerr by actual block test. The lubrication is a combination of force feed and splash. The rear axle is the Oldsmobile-Torbensen internal-gear drive. The load-carrying member is an I-beam steel forging, insuring great strength with relatively light weight. The frame embodies unusual strength. Wheels are of the artillery type, with demountable rims. Transmission is selected sliding type, three speeds forward and reverse.

✣

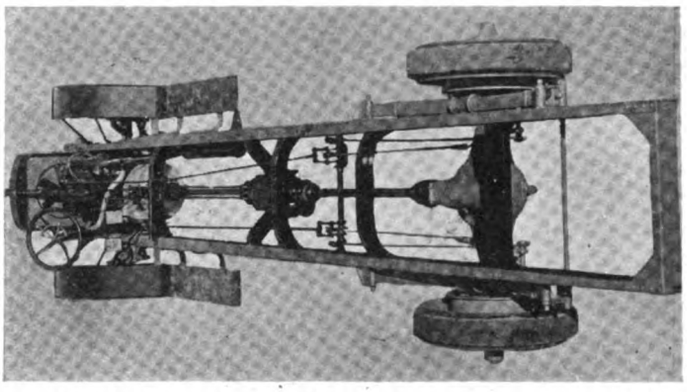
ONEIDA.—The national shows will bring before prospective motor truck purchasers for the first time the new Oneida models of gasolene-propelled motor trucks and the new Oneida unit-drive electric truck. The new gas models which will appear in five sizes—from 1¼- to 5-ton capacities—are a decided departure both in construction and design, from the present Oneida production. Notwithstanding their oversize dimensions and capacity for heavy work, the new Oneida models are faster, more flexible and perform with an ease and smoothness which resembles that of a pleasure car. All units in the new models are factory design and bear the Oneida trade-mark, the company having discontinued entirely the use of the units used in the present line. In the 5-ton job which is illustrated here the Oneida engine is an overhead valve type with mechanism enclosed, tappets and rocker arm bearings, lubricated by pressure oil feed—three-point suspension. Very great features of convenience, accessibility, and an unusual attention to motor truck speed will be found in all the models making up the new and complete line offered by the Oneida Motor Truck Company, Green Bay, Wisconsin. The new models are A9—1¼-ton; B9—1¾-ton; C9—2¼-ton; D9—3½-ton and E9—5-ton.

✣

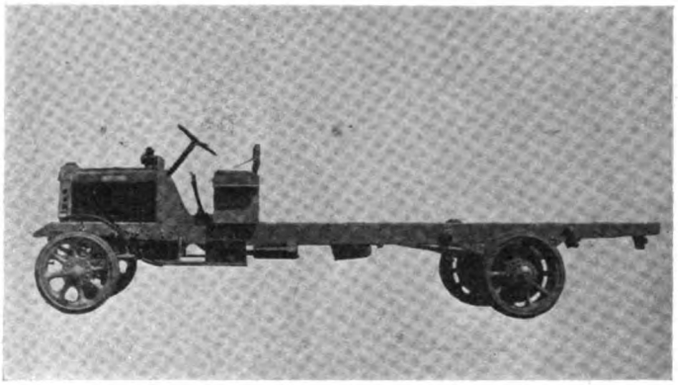
PACKARD.—Pneumatic tired motor trucks, designed to meet the demand for greater speed and wider range in motor truck transportation, are announced by the Packard Motor Car Company for 1920 production. These new models are the first pneumatic tire machines to be manufactured by the Packard company, and are distinct in design from the solid tire models. They are built in three different sizes, giving a large range in capacity. The fact that they are specifically designed for pneumatic tires is considered a long step in the application of the motor vehicle to special work. A recent statement of the company says, "The pneumatic tire when put on a wheel intended for a solid tire gives a much larger wheel diameter, increasing the gear ratios heavily. The consequence is rapid engine deterioration because the engine is laboring constantly. The problem has been one of design rather than adaption. The pneumatic motor truck models are specifically designed for the work they do."

✣

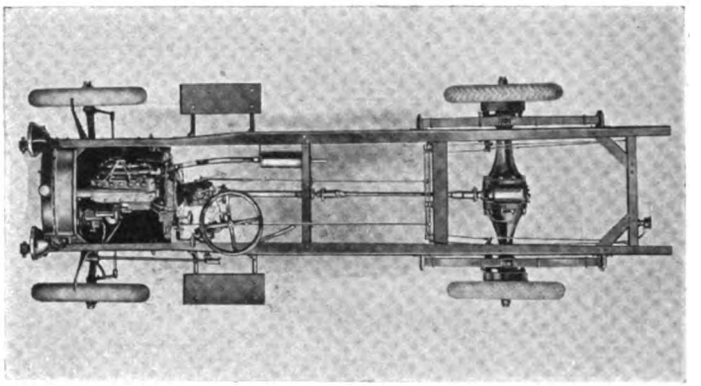
PAIGE.—The Paige machines in 2½- and 3½-ton models using the following standard parts will be shown at Chicago: Continental engine, Bosch magneto, Stromberg carbureter, Brown-Lipe clutch and transmission, Timken axle, Perfection springs, Jacox steering gear and Parish frames.



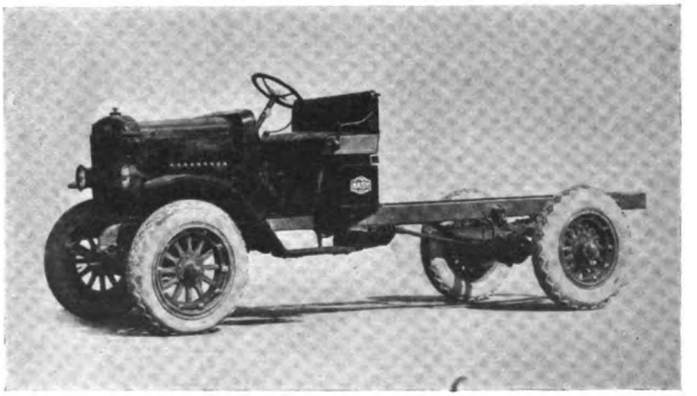
Kissel.



Master, 5-ton.



Maxwell, 1½-ton.



Nash 2-ton.

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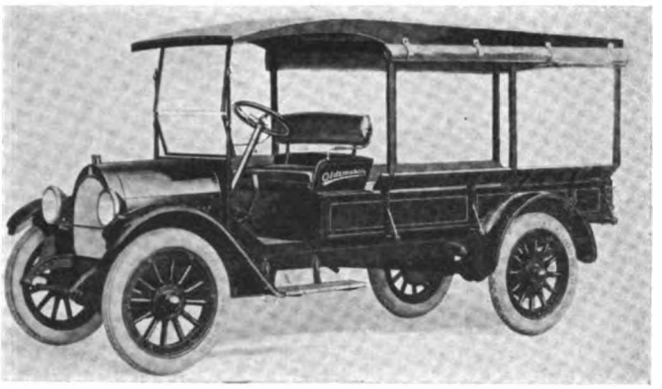

Oldsmobile.

PARKER.—During the latter part of 1919 the Parker Motor Truck Company has been changing the design of its motor trucks so as to make the line which is produced of the 2-, 3½- and 5-ton size a completely standardized product. This means that practically every part is the same in all three models except that the parts differ in size according to the strength required for the size of motor truck in which that part is used. Wisconsin motors are used throughout, this motor being of the cast-en-block, removable head type, with valves to right. Brown-Lipe clutch is used as standard equipment in all models. In the 2-ton model the Fuller transmission is used, while in the other models we make use of the Warner type T53-1, the transmission in every case being mounted amidship and being connected with the clutch by means of a tubular propeller shaft employing Thermoid-Hardy joints at either end. The propeller shaft between the transmission and rear axle are in all cases tubular with two universal joints employed, one being of the stationary and the other of the slip type as in common practice. Parker motor trucks in the 2- and 3½-ton models use their own type of axle, while in the 5-ton model the Timken standard 5-ton axle is used. Particular attention is called to the model J9-3½-ton capacity, a motor truck in which the tread is 58 inches front and rear. This produces a road machine which may be rightfully named the intercity transport motor truck, the principal feature being that due to the narrower tread it is possible for it to operate over bad roads and rutted roads with much less effort and less danger of slipping into the ditch.

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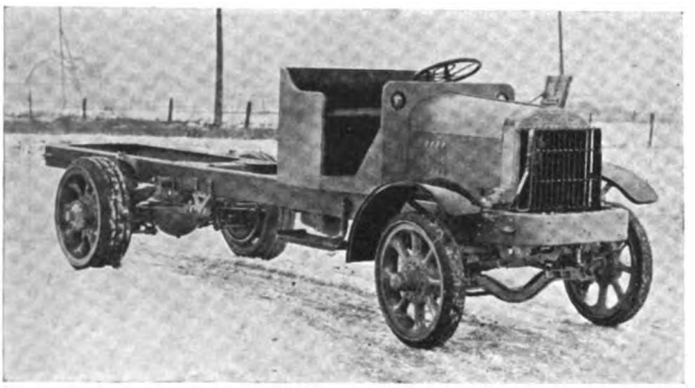

Oneida E9, 5-ton.

PATRIOT.—The Lincoln model, which was formerly rated at 1½ tons, is now rated from 3000 to 5000 pounds; and the Washington model, previously rated at 2½-tons, is now rated from 5000 to 7500 pounds. This added power is the result of the use of the Hinkley engine. The engine in the Lincoln model has a bore of 4 inches and a stroke of 5¼ inches; the Washington model has a 4⅛ inch bore and a 5½ inch stroke. The clutch is the Covert multiple-disk clutch of the type developed for use in military motor trucks during the war. It is mounted in the flywheel and is completely enclosed in a standard S.A.E. bell housing. The transmission is Covert 4-speed, mounted amidship, carried on subframe. The Empire axle is used in both of these models. The differential is Brown-Lipe-Chapin, of the 4-pinion type. On the Lincoln model the gear ratio on high is 7.25 to 1; and the total gear reduction on low is 34.8 to 1. On the Washington model the gear ratio on high is 10.66 to 1; and the total gear reduction on low is 50.63 to 1. The drive is of the Hotchkiss type. The Revere model is new, and was added in 1919. The capacity is from 1500 to 2500 pounds. In this model the transmission is 3-speed, mounted amidship; the rear axle is Empire worm, same type as used in the other models. The engine is Continental model "N," 3¾ bore and 5 inch stroke. Stromberg carburetor is used; ignition is by Atwater Kent Uni eparker; Bijur lighting and starting is regular equipment. The Revere is regularly equipped with 35x5 pneumatic cord tires and demountable rims.

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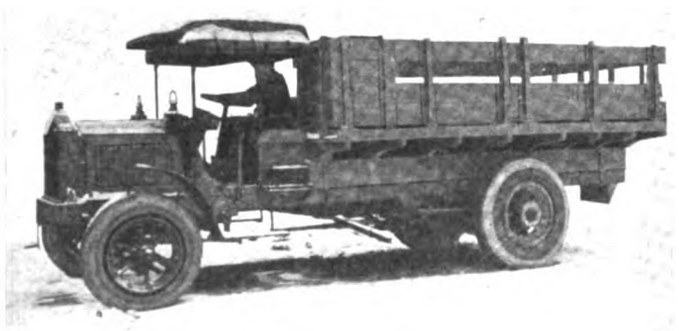

Packard.

PIERCE-ARROW.—Recent improvements in the current Pierce-Arrow models include ratchet grease cups, oil pressure gauges on dash, hub odometer on left front wheel, foot accellerator now located at right of brake pedal, flexible glass windshield with rain vision cleaner now standard. The clutch has been made dustproof by close-fitting oil-retaining ring. The ball bearings on throw-out collar have been replaced by thrust bearing as on passenger car construction. The engine oiling is now done under pressure, the oil being carried in a crankcase pump, as on passenger cars. Increased oil pressure has caused the elimination of troughs in the crankshaft and connecting-rod bearings; oil grooves are used and bottom piston ring omitted. The water pump has been moved forward, allowing a special lighting generator installation without any difficulty. To insure better low-grade fuel carburation a new carbureter is used together with intake manifold with water connection to radiator. Changes made in the drip pan provide easier access to the under side of the engine and transmission. The transmission is of the three-speeds-forward type and the improvements include a countershaft extension facilitating power take-off arrangements. Improvements in the already comparatively easy steering include a 19-inch diameter Bakelite wheel, a greater reduction in worm and nut and a larger clamping bolt at the bottom.

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Paige 3½-ton.

RAINIER.—The 1920 models of the Rainier Motor Corporation differ only in minor respects from those put out during 1919. As heretofore, this company specializes in the lighter tonnages. There are four sizes, having respectively carrying capacities of ¾-, 1-, 1½- and 2-tons. All models have Continental motor, Brown-Lipe clutch and transmission, and worm-driven rear axle. The ¾-ton has the Timken rear end, while the other models have Sheldons. All are fitted wtih Zenith carbureters, Monarch governor and magnetic ignition, either Simms or Bosch, optional. The gear set and motor are mounted as a unit power plant, the 2-ton chassis having the Model 30 Brown-Lipe transmission, while the other sizes have the Brown-Lipe Model 25. Thermo-syphon cooling is used throughout, with a sheet metal radiator and fan. Hotchkiss drive is employed on all models in conjunction with double safety spring shackle on the rear springs. The ¾-ton model enjoys the distinction of being the only worm-driven type of this size on the American market. It has always been the aim of the company to manufacture in the lighter sizes as good a vehicle as the leading American heavy-duty motor trucks are acknowledged to be in their class. Rainier chassis are thoroughly standardized, being composed of the best units obtainable, and constructed according to the modern engineering practices. A full line of stock bodies is carried in various styles, both open and closed.

✚

REO.—The 1,500-pound spur-gear driven "Speed Wagon" will be on exhibit at New York. This machine is made up of a Reo be on exhibit at Chicago. This machine is made up of a Reo mission, Reo axle, Penn springs, Reo steering-gear and frame.

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REPUBLIC.—Nine internal gear driven Republics, 1-, 1½-, 2½-, and 3½-ton, using a Continental engine, Eisemann magneto, Stromberg carbureter, Fuller clutch and transmission, Torbensen axle, Mather springs, Jacox steering-gear and Savage frame, will make up the display of this company at the Chicago show.

✣

SANDOW.—Five models of the Sandow will be continued throughout 1920, the 1½-, 2-, 2½-, 3½ and 5-ton. The changes in these models are not marked, following well established practices in refinement only. Standard parts are used as follows: Continental engine, Bosch magneto, Stromberg carbureter, Brown-Lipe clutch and transmission, Timken axle, Garden City springs and Ross steering-gear.

✣

SCHACHT.—This 5-ton model is representative of the entire Schacht line which also includes 2-, 2½- and 3½-ton capacities. The 10-speed transmission, however, will only be incorporated in the 3½- and 5-ton sizes; a regular 4-speed transmission is to be employed in the 2- and 2½-ton jobs. The general chassis design in the 1920 models will be the same as the 1919 models, although a number of refinements have been made towards simplifying and making the chassis construction more accessible. The clutch and brake pedals, together with connections, are now mounted on a single shaft which can be removed as a unit when necessary, greatly expediting the making of any repairs or adjustments. The service brake will be mounted directly in back of the transmission and at the forward end of the front propeller shaft, instead of at the rear end of the front propeller shaft as in the 1919 models. In addition to the 10-speed transmission on the 5-ton chassis, a larger Buda engine will be used having a bore of 4½ inches and a stroke of 6 inches. The 5-ton motor truck with 10-speed transmission is capable of attaining a speed of twenty to twenty-five miles an hour on high gear over good, level roads at an engine speed of 1,000 r.p.m. The use of the 10-speed transmission with its wide range of gear reductions will not only permit a high rate of vehicle speed when conditions justify, but also provides tremendous pulling power on the lower gears, enabling the motor truck to negotiate any kind of a road or grade where the wheels can secure traction.

✣

SELDEN.—The Selden "A" series motor trucks have been designed and built to meet the conditions as the user finds them. The keynote then is flexibility. The actual manufacturing of the models was not started until the motor trucks had been given rigid tests in actual service—they are tried and proven, built for work. The 3½ A model will serve as an example of these flexible, in-built quality motor trucks. Features of the chassis are the full flexible frame, the flexible mounting of all units, the absence of all rivets, amidship transmission designed for all types of power take-off and new flexible radius rods, special over-size clutch and a general refined chassis with the careful consideration for long life installation. The engine is the Continental model E-7, 4½-inch bore, 5½-inch stroke. The clutch is a special design made by the Brown-Lipe Gear Company. It is fitted with a greater number of plates than used in standard practice to give long life and stand up under abuse. To increase the life of motor trucks and to obtain the best safe braking action, a differential equalizer is installed in both the foot and emergency brake lines. Through this equalizer an equal pull or pressure is exerted on both wheels at the same time. Another point of in-built quality.

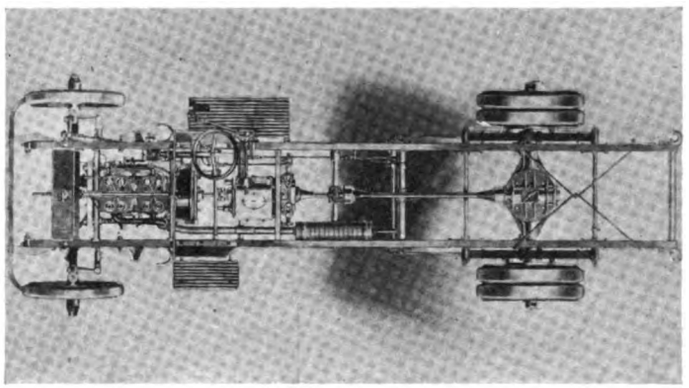
✣

SERVICE.—The Service Motor Truck Company will build motor trucks of the following capacities during 1920: 1-ton, 1½-ton, 1½-ton special, 2½-ton, 3½-ton, 3½-ton special, and 5-ton. There will be but few changes over the 1919 models, what few there are being more in the nature of refinements than radical changes from principles of construction that have proved correct. Model 36, illustrated, is the 1½-ton model that will be on exhibition at both the New York and Chicago Motor Truck Shows. The engine has 4¼-inch bore and 5½-inch stroke. Particular attention is paid to chassis lubrication. The spring shackles, for instance, are provided with large oil reservoirs, from which the oil is filtered through felt to the different bearing surfaces. The oil wells hold sufficient oil for about two months' requirements. Refilling is accomplished through large filler caps held in place by springs to exclude dirt. Service and emergency brake pull-rods are interchangeable, making it unnecessary to remove gear wheels to renew brake bands until both sets have given full service. Model 36 is equipped only with 35 by 5-inch pneumatic cord tires on the front wheels, and 38 by 7-inch pneumatic cord tires on the rear. It is designed for a speed of from eighteen to twenty-five miles an hour.

✣

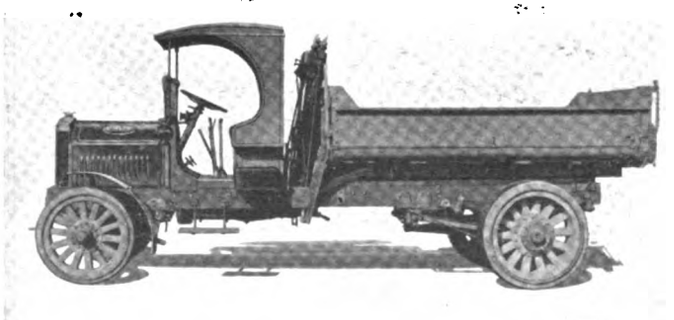
STANDARD.—From a Continental engine in the front, to the Timken final worm-drive in the rear, Standard motor trucks are built of standard units throughout. The universal joints, steering-gear and magneto, the radiator, the springs, the clutch and transmission and other units built in Standard motor trucks are the best known units possible to secure. The advantages of a Standard motor truck built with standard units are many. First and foremost, the quality of the standard units incorporated in motor trucks insures efficient operation and large service. Built as they are by the largest factories of their kind in the world, and by organizations specializing in the one particular product. Second, motor truck owners are provided with double and triple service facilities: First, Standard Service; second, the service maintained by the manufacturers of standard units, and third, the services supplied by large service organizations which are familiar with the units in Standard motor trucks, because they are standard—known, sold, and used the world over.

Parker J9 3½-ton.



Pierce-Arrow, 5-ton.

Rainier.



Schacht 10-speed, 5-ton.

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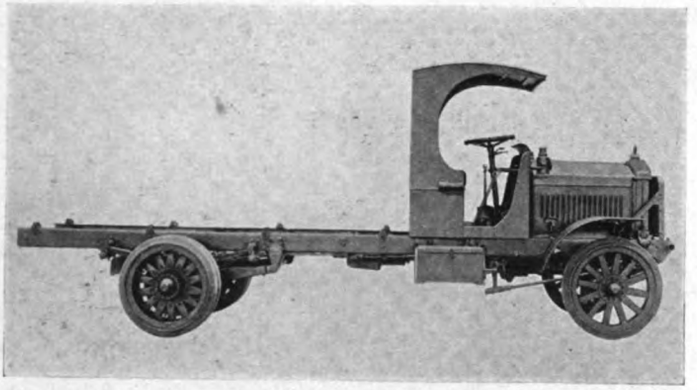
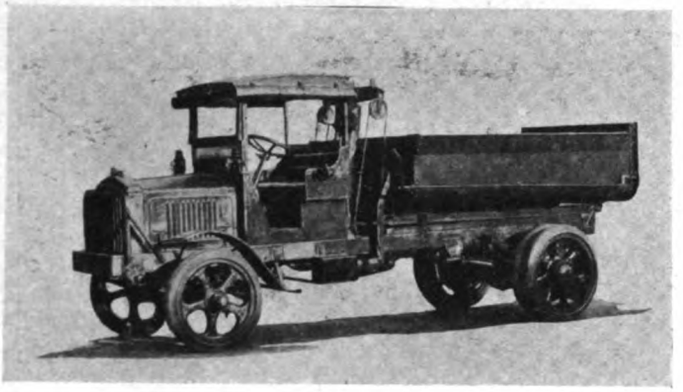
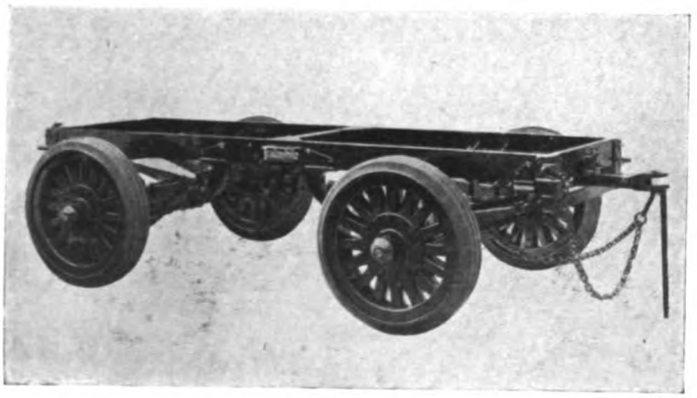


Selden, 3½-ton.

Service 1½-ton.



Standard 5-ton.



Trailmobile.

STEWART.—The Stewart 2,000-pound delivery truck is a machine made to meet a popular demand. It is not a remodelled passenger car, but designed from the ground up as a motor truck, by expert motor truck manufacturers who have demonstrated their ability and the quality and economy of their product. Merchants, publishers and farmers have created the demand for this motor truck. No solid tires to rattle the car and the goods to pieces; it travels on five-inch cord tires and is intended for quick delivery runs—to get there and get back, and for the heavier hauling from depots and warehouses. Because good drivers are scarce and high-priced, this new Stewart is made to humor them; it has electric starter and electric lights. It carries out the Stewart policy of simplicity—all useless parts eliminated. It will prove its value in muddy and sandy country, as well as city streets. It will make business hum. The Stewart 1-ton delivery truck is built in both open and covered-express models. It is built on the same principles as the 3½-ton Stewart, only smaller. In addition to electric starter, electric lights, and five-inch cord tires, it embodies the following features: real truck rear axle, cast tank radiator, front bumper, rebound plate on all four springs, upper windshield swings for rain vision, lower for ventilation, oilless bushings and few grease cups, completely equipped at a popular price to be announced at Chicago show.

✣

TRAILMOBILES.—Trailmobiles are made in four-wheeled, Semi-Trailermobile and pole types. This chassis is that of a model 5-ton reversible type. It is built throughout according to the best standards of motor truck construction, but without motor or transmission assemblies. The chassis consists of a frame assembly and two interchangeable axle assemblies attached to the frame by semi-elliptic springs. The steering mechanism is carried on the axle and the drawheads on the frame. The automobile type of steering control is used, making it possible for the trailer to follow the motor truck exactly in turning a corner. The pivoted type of drawhead permits the trailer to be backed around a corner. The drawhead at either end may be used for steering, as occasion may require. Heavy automobile type of construction throughout makes these Trailmobiles almost unbreakable when used with their proper loads. Every moving part is provided with bushings and grease cup lubrications. Every wearing part is replaceable, giving each Trailmobile shown a practically unlimited life. This model M Trailmobile shown is made to carry a pay load of 5 tons with a body allowance of 1800 pounds. The wheelbase is 86 inches, and the tread of the wheels from center to center 70 inches. It is equipped regularly with 36 by 7 inch solid tires.

✣

TRANSPORT.—The Transport Truck Company, Mount Pleasant, Michigan, will make no radical changes in its 1920 production. However, many refinements and conveniences for the operators have been added. All 1920 Transports will be equipped with new aeroplane control system for gas and spark. This insures absolute accuracy in the position of spark and gas throttles and eliminates all rods and joints used in former construction. The position of the brake and clutch has been changed to aid the comfort of the driver. Changes have also been made in the design of the gas tanks and fittings, and hoods and fasteners have been improved. Hot-spot intake manifold, impulse starter, motometers, and hub-odometers are regular equipment on all Transport models. A new model of 3½-tons capacity is now under construction and will be called Model 70. This model will complete the Transport line for 1920. The Transport Truck Company has just moved and is now operating in its big, new daylight factory, which has a capacity of fifteen motor trucks per day, and plans have just been completed whereby this production will be increased to thirty machines per day by August first.

✣

UNION.—The general lines of these new models remain about the same as the old, but there are many changes in design and construction—added refinements which make these motor trucks more accessible and less liable to small breaks. The motors are the new type Wisconsin, detachable head, rigid face assembly, chrome nickel crankshaft, force feed lubrication—all bearings extra large to care for pneumatic tire equipment. Tungsten steel valves—special provision to prevent oil leaks—hot spot manifold—valve stems automatically lubricated from crank chamber and all tight cover plates. The springs are heavier and longer. The frame is 7½ inches deep instead of 6 inches, and has bumpers of the same material in front. The spark and throttle control are changed—placed outside of the steering post, making a more rigid construction and eliminating the use of small gears at the bottom of the steering column. The brake rod supports are changed—mounted in a compact way which allows for easy lubrication. The starting crank is enclosed in a housing which is easily removed, allowing the easy replacement of sheared off crank pins. Both starting crank and housing are well protected by the bumper.

✣

VELIE.—A new 1½-ton motor truck has been added to the 1920 Velie line and the former 2-ton model discontinued. For the coming year Velie motor trucks will be furnished in two sizes, the 1½-ton at $1925 for the chassis and a 3½-ton heavy-duty motor truck at $3950. Ten years' experience in motor truck building has convinced Velie that the average merchant, whether in city or country, finds greatest use for a 1½-ton machine. This is true of the general merchant, the implement dealer or the transfer man. In fact, many manufacturers prefer the quick action of numerous 1½-ton models to the slower service of machines several times heavier. The farmer also needs a 1½-ton motor truck; anything smaller than that is too light for his work and will not carry a body large enough to handle the diversified farm loads efficiently. Then there is the demand for heavy-duty motor trucks, such as tipping trucks for contractors' work, large van bodies, wholesale houses and heavy hauling of all kinds which are met successfully by the Velie 3½-ton machines, of which model thousands are now in daily use. Both models are of well-known Velie quality, furnished in several wheelbase lengths and all body styles.

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VIM.—The following memo concerning the new worm-drive Sheldon rear axles which we have incorporated in the Vim ½-ton model are identical to the axles which have been used in heavy duty Vim motor trucks, except as to size. The standard ½-ton motor truck with this improved Sheldon axle equipment is to be known as Type 27 and the ½-ton Vim Special as Type 28, but otherwise this is not to be considered as a new model. Other refinements have been made which are: The new Sheldon worm-drive rear axle has a ratio of 5½ to 1, which increases the power of the machine as a unit as compared with the axle used on the Types 21 and 26, which had a ratio of 5¼ to 1. Under normal conditions the propeller shaft is practically horizontal, which is the ideal working condition for this shaft. The brake rods have no turn buckles, as all adjustments are made by threaded clevises. The front wheels are equipped with roller bearings instead of the ball bearings with cup and cone. The engine crank case is provided with a positive relief valve in the oiling system on the front of the crank case which is set to relieve the oil pressure, so there will be no further breaking of the oil gauge glasses. In connection with this there is now a plug in the front of the crank case, the removal of which makes it possible to clean out the spray pipe in the crank case without removing the crank case from the engine. The carbureter choke is controlled from the steering column instead of from the front of the chassis, so that in cold weather the driver can operate his motor truck until the engine warms up with the choke partially closed, thereby saving considerable time in getting started.

✠

WALKER ELECTRIC.—Improvements in the Walker Vehicle Company's product are to be noted as follows: Chassis frame changed from rolled to pressed steel channel; bumpers changed from cast steel to larger pressed steel type for better protection of cab and driver; seat box enlarged to full size with angles for attaching to cab; floor boards and dash furnished with dash lamps installed and wired complete; size of power wiring increased for higher efficiency. Models for 1920 Walker electric road truck chassis —½-, 1-, 2-, 3½-, and 5-ton load capacity. Walker electric road tractors, Model No. 3 for hauling trailers, capacity 15 tons gross trailing load; Model No. 5 fifth-wheel type for hauling two-wheel trailers, capacity 10 tons gross trailing load; Model No. 7, crane type, for loading and hauling trailers, hauling capacity 15 tons gross trailing load, lifting capacity 2 tons.

✠

WALTER.—The 3½-ton Walter, upon which the Walter Motor Truck Company, of New York City, specializes, will be shown at the Chicago show. This machine is driven by a Walter engine and has for its standard parts: Swiss magneto, Zenith carbureter. Other parts are made in the Walter factory.

✠

WARNER TRAILERS.—Warner Trailers are made in four types, four-wheel heavy duty truck trailers, semi-trailers with the Warner fifth-wheel, two-wheel trailers with swivel bolsters and auto trailers. There are four sizes of the four-wheel type, 1½-ton, 2½-ton, 5-ton and 7-ton. The construction is the same at both ends, with an auxiliary steering bar which can be applied to the rear steering mechanism so that the operator can describe a figure "S" within a distance of four times the trailer's length. Among the outstanding features are the special heavy duty drawbar with spring cushions which absorb the shock of pulling or pushing which relieves the clutch of the motor truck. There is a one-man coupling device which enables the operator to lay the coupling bar on the drawbar and then back the motor truck until it automatically catches. Semi-trailer types are made in four sizes—2½-, 3½-, 5½- and 11-ton. The outstanding feature of the Warner semi-trailer lies in the construction of the Warner fifth-wheel with its scientific adaptation of the ball and socket principle. Warner two-wheel trailers are made in four sizes—1¼-ton, 1¾-ton, 2¾-ton and 5½-ton. The requirements of many lines of business call for special construction and changes which can be furnished. Auto-trailers are furnished in many types with capacity of 1,250 pounds, 1,500 pounds and 2,500 pounds.

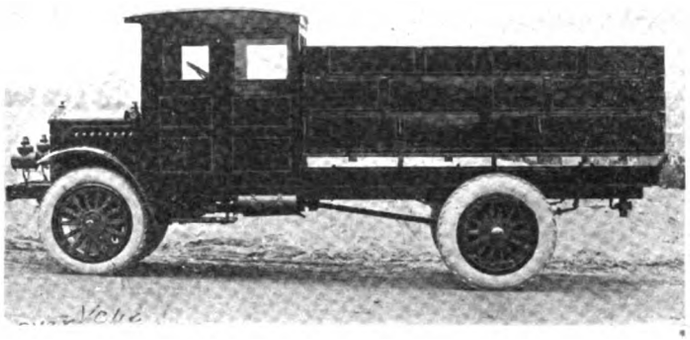
✠

WILSON.—Wilson motor trucks for 1920 will be made in four sizes, 1½-, 2½-, 3½- and 5-ton, in place of the 1- and 2-ton which were previously manufactured, but now will be retired from production. On the 1½-ton machine a Continental motor, 3¾ by 5, with a piston displacement of 221 inches, will be used. All 1920 engines will be Continental models J-4, K-4 and L-4, and these engines have removable cylinder heads. All models are cooled with a pump, no thermo-syphon system being used in any size. The cone clutch is discontinued and dry disk on all models is used. On the 1½- and 2½-toners, the Thermo-Hardy universal is employed. Transmissions are 4 speeds forward and 1 reverse, mounted amidship. Both front and rear axles are Timken. The 1½-ton chassis is equipped with the semi-floating type, and all other models are full floating. The weight of the frame has been changed somewhat, the 1½-ton weighing 6½ pounds to the foot, the 2½-ton 8 pounds, the 3½-ton 12¼ pounds and the 5-ton 14¾ pounds to the foot. On the 3½- and 5-ton sizes metal wheels are used in place of wood. The essential fact in connection with Wilson 1920 motor trucks is that they are all standardized on one chassis, and a driver accustomed to operating a 1½-ton machine can just as easily handle the 5-ton size without discomfort or loss of efficiency.

✠

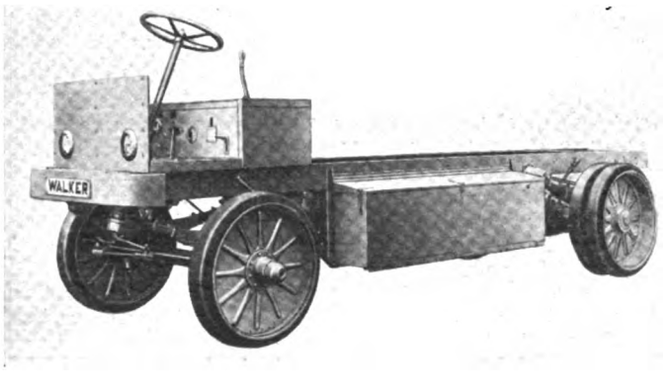
WINTHER.—The 1920 Winther models will be practically the same as the 1919 chassis with the exception of refinements in some of the units used. Wisconsin motors, for example, which are now standard equipment for all Winther motor trucks, are much more accessible because of the new type of detachable cylinder head, and the force feed method of lubrication is made more effective by bolting the oil pump to the upper section of the aluminum crankcase. Disk metal wheels are regular on every model replacing the spoke type on the 2-ton motor truck, and the rear axle will be one piece instead of the three-piece riveted section previously used, giving a stronger and more compact construction. On the front axle of 1½-ton four-wheel drive the steering knuckle bodies will have bushings to afford protection for both the steering pin and knuckle. The 1920 Winther models will include 1½-, 2-, 3½-, 4-, 5-, 6- and 7-ton chassis in the rear-driven type and 1½-, 2½- and 3½-ton four-wheel drives.

Union 2½-ton.



Velie, Model 46, 1½-ton.

Vim ¾-ton.



Walker Electric.

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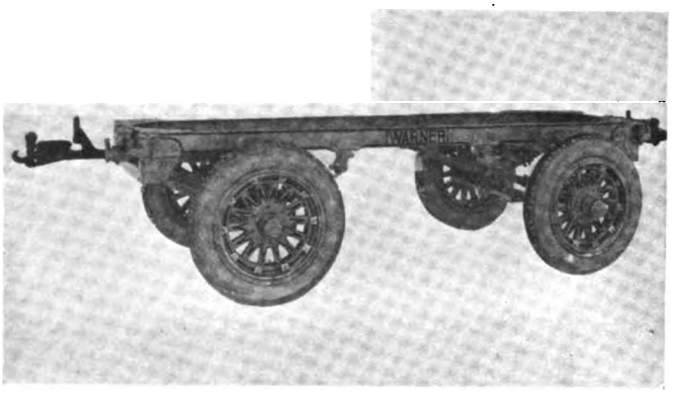
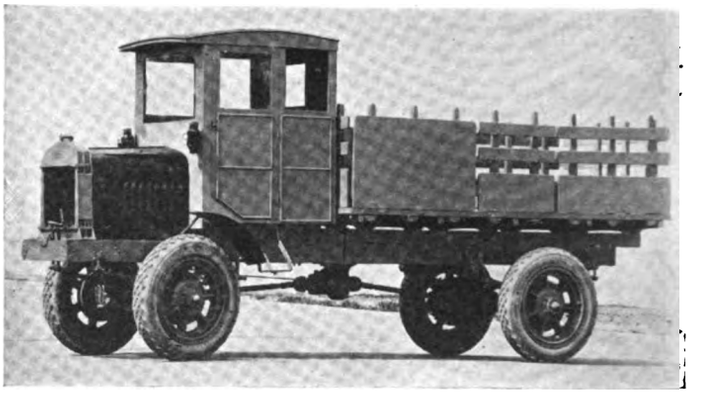


Warner, 4-wheel trailer.



Winther, 1½-ton, all-wheel drive.

As Power Units for Switching Trucks Will Save $80 a Day

As a real adjunct to the railroad, not only in intercity haulage but actually to handle materials of the railroad for short hauls has come the motor truck, according to M. L. Pulcher, vice president of the Federal Motor Truck Company, Detroit, Mich. Mr. Pulcher, who has had many years' experience in the traffic department of one of the leading railroads of the country, believes that the motor truck used as an adjunct in the terminal switching service of railroads will help offset the inadequate terminal switching facilities throughout the country.

"It is the present practice of the railroads to handle company material and stores at division points in switching service," he declared. "Where motor trucks have been employed by the railroads a great operating service has been accomplished and this has also released their own motive power, tracks and equipment for the handling of carload traffic which must of course be handled by the present methods. Motor trucks could also be very properly used where trap car service is given. There is a very large amount of less than carload merchandise switched between sub-stations and transfer houses which could be handled to much better advantage by motor trucks. The present operating cost of a locomotive in switching service is probably in the neighborhood of from $75 to $100 a day. The daily operating cost of a motor truck is from $12 to $20 a day, including maintenance and all other items entering into operating costs."

Tri-City Show March 8

It has been decided to go ahead with the annual show of the Tri-City Auto Trades Association and it will be given at the Billy Sunday tabernacle in Rock Island, Illinois, on March 8 to 13, inclusive. Uncertainty as to the possession of the building which has been occupied as a depot for the sale of army supplies, has been dissipated, and the trustees have received assurances that the government will be through with the structure the first week of March. J. H. Van Vliet of Des Moines, Iowa, has been engaged as manager. Thirty-three firms have been allotted space and one hundred cars will be displayed.

City Calls on Truck to Aid Harbor Plan

Monterey, California, Expects Motor Transport to Create Million Dollar Breakwater After Railways Prove Impossible

HOW motor truck transportation is being requisitioned by the Chamber of Commerce at Monterey, California, as a means of obtaining support for the construction of a million dollar breakwater in Monterey harbor, is told in a report recently submitted by E. Farr, chief of Firestone Ship by Truck Bureau, at Akron, by a Pacific coast representative.

"The business men of Monterey," the report says, "petitioned the government for the improvement before the war. They were informed that it could not be considered unless a railroad was built between the Lalinos valley, in which Monterey is located, and the San Joaquin valley, a region especially rich in fruit and therefore capable of sending valuable products through the proposed harbor in reaching out for foreign markets.

"Monterey's business men knew that they could not interest capital in the construction of such a railroad and were compelled to drop the harbor project. California's first railroad builder had considered the building of a railroad uniting the valleys they recalled, but had given it up as impractical on account of the rugged character of the Pacheco Pass, through which the right of way would have to be constructed.

"Thus matters stood until last summer, when three things happened which aroused new interest in the harbor project.

"First of all, the Pacific fleet put in at Monterey. This stirred Monterey citizens to a renewed realization of the neglected possibilities of the harbor. At about the same time California voted a $40,000,000 bond issue for good roads, which included an appropriation for the building of a hard-surfaced highway through Pacheco Pass. And then, a short time later, California's first motor truck train made a 1,000 mile trip from San Francisco to Los Angeles and back, and by so doing called attention in a forceful way to the practicability of motor transport when combined with good roads.

"This latter suggested an idea to the sponsors of the old breakwater project. Why not remove the transportation stumbling block, they asked themselves, by substituting the motor truck for the railway train? And they at once set about developing the idea.

"They called in the director of the branch of the Firestone Ship by Truck Bureau at San Francisco, who had promoted the motor transport demonstration, and asked him to convince them that motor truck transportation between the two valleys could be made entirely practicable.

"After he had made a thorough survey he submitted a report which proved so convincing that the Chamber of Commerce will resubmit its petition for the harbor improvement, basing its action on the practicability of opening the facilities of the improved harbor to the producers of San Joaquin by means of numerous motor trucks operating over the new highway.

"The survey which was made disclosed the possibility of obtaining sufficient tonnage to provide motor trucks with loads both ways. It was found that for the trips to Monterey, the San Joaquin's fruits and miscellaneous products passing through the harbor on their way to Oriental and coast-wise markets would provide a heavy tonnage, and that there would be provided for the return trip almost an equal amount of tonnage in lumber and other requirements of the valley brought into Monterey by ships instead of being sent to San Joaquin by railroad from San Francisco harbor.

Those interested in the harbor project declare that the facts disclosed by the survey assure the financial success of any reasonable number of motor transport companies that may organize, and that because of this fact they feel confident they will not lack a cause when their breakwater petition comes up for hearing.

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New Worm Gear 97 Per Cent Perfect

Test Made in England on New David Brown & Sons' Product Shows Encouraging Results in Laboratory Try-out

AS long established manufacturers of worm gear for general engineering purposes, David Brown & Sons have been naturally much associated with the problems relating to this type of gearing. Quite apart from their connection with the automobile industry and the quantities of worm gears furnished by them for road traction. This company has a long record of close investigation into the special problems connected with its products, with the result that the theory underlying worm gear has been developed to a high scientific and mathematical degree.

In following out a certain line of mathematical investigation, some highly important conclusions were reached, and, as these particular mathematical investigations were of a very abstruse order, the company submitted them to Faraday House, where they were checked by Dr. Alexander Russell, who pronounced them correct. The practical result that has followed on these calculations is the development of a worm gear giving over 97 per centum efficiency, as certified by a test made at the National Physical Laboratory on the Daimler-Lanchester worm gear testing apparatus.

When the gears for this particular test were in the final stages of manufacture, a representative from the National Physical Laboratory visited the Brown company's works and sealed the worm and wheel in order to constitute a proof that they were an ordinary production job and had not run together previous to the test being made.

THE illustrations (fig. 1) show the details of the character and area of contact in the new F. J. gears. The view on the left shows the worm in such a position that the drive is taken by the three threads A, B, and C, whilst that on the right shows the worm in a different position, having been rotated through an angle of 45 degrees, with the result that the two threads A and B are in simultaneous contact with the worm wheel. The area in dotted outline across the teeth of the worm marks the zone of contact between the gears when the worm is rotated in the direction indicated in the end view. The intersections of the worm threads and the zone give the lines of contact between the worm and wheel teeth, and at no point outside this zone is there any contact between worm and wheel. It is this contour of the zone of contact that was arrived at by the mathematical calculation previously referred to, and which was submitted to Faraday House.

In the left-hand view, the actual contact between the worm thread A and the wheel is marked by the dotted line 1—1A, that between the worm thread B and the wheel by the line 2—2A, and on the worm thread C by the line 3—3A. In the right-hand view the worm has been rotated through an angle of 45 degrees, the new line of contact being again shown dotted, only in this case the worm thread C has passed beyond the zone of contact and

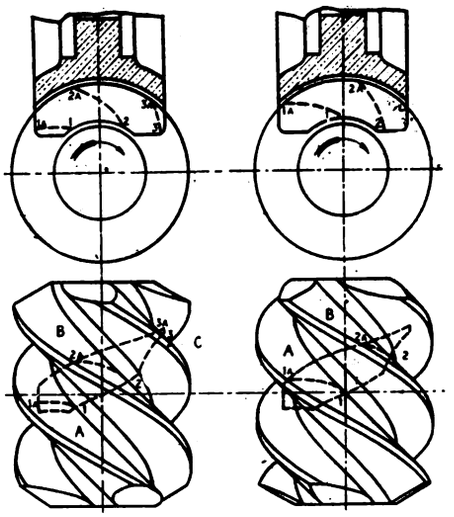

Fig. 1.
Showing zone of contact.

has thus ceased to make contact with the worm wheel.

The illustrations (fig. 2) show the zone of contact for a 4-threaded worm of the ordinary shape in which the teeth of the worm are straight-sided in section; that

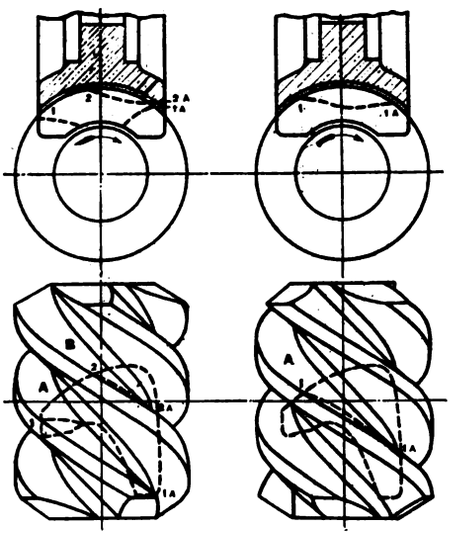

Fig. 2.
Old method of worm contact.

is to say, in the form of a rack. As the linear section of this type of worm corresponds to a straight-sided rack, and as the straight-sided rack forms the basis of the involute spur gear, this shape of worm is generally known as the involute worm. As before, the zone of contact is shown in dotted line, but in this instance two teeth only are in contact in the left-hand view—A and B—giving lines of contact 1—1A and 2—2A, whilst in the right-hand view the tooth A carries the entire load along the line of contact 1—1A. The unsymmetrical contour of the zone of contact will also be observed. More noticeable still is the difference between the irregular lines of contact shown on the end view of the involute worm as compared with the symmetrical lines of the F. J.

It must be understood that in both cases whenever the worm is revolved through an angle of 90 degrees, the line of contact 1—1A will sweep across the zone of contact until it takes up the position marked 2—2A, because when a four-threaded worm is moved a quarter of a revolution (or 90 degrees), the thread A will naturally take up the position of the thread B. In the F. J. system, it will be seen that the point 1 at the root of the worm (end view) falls into the position 2 after a quarter of a revolution; that is to say, the actual contact travels *in the same direction* as the worm through a distance of approximately 50 to 60 degrees, hence about two-thirds of the motion is transmitted by a rolling action and only one-third by sliding. This means that a rolling action is introduced between the teeth of the gears, thereby reducing the ordinary rubbing velocity to a minimum. Thus the gear teeth, instead of rubbing against each other at, say, 1,000 feet per minute, really only rub at the reduced speed of about 350 feet per minute, due to the rolling action of the F. J. tooth contact.

This is not so on the involute worm gear system. In the left-hand view in fig. 1, the point of contact 1A actually moves *in the opposite direction* to the rotation of the worm to the point 2A, thereby giving the rubbing velocity even more than its full theoretical value, whilst rolling action, at the ends A of the lines of contact, is absolutely non-existent.

A peculiarly inefficient characteristic of the involute system is that the extremities of the lines of contact (see plan view of worm) travel from positions 1 and 1A *towards each other,* until they meet, and vanish just beyond the points 2, 2A, as shown in the left-hand plan view (fig. 2).

The plan view of the F. J. system (fig. 1) shows the points A always moving from left to right, in the same direction as the rotation of the worm, whilst the left-hand plan view of the "involute" system shows the point A moving very slightly from right to left, actually against the rotation of the worm. The high rubbing velocity which occurs on the points AA, together with the converging lines of contact which induce a concentrated load, all tend to produce the worst possible conditions on the leaving side of the

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worm wheel. This explains the well-known fact that when a worm gear of the "involute" type is overloaded, "pitting" first takes place on this side of the wheel, and on this side only, whilst those portions of the teeth on the entering side of the wheel remain unmarked. David Brown & Sons believes that this is the first time that the phenomenon of uneven wear on the teeth of the worm wheel of the "involute" system has ever been correctly explained.

The Automobile Engineer.

Trucks Not Only Save Business but Triple Output for Cooperage Firm

"We are doing three times the volume of business we did four years ago, mainly attributable to the fact that we have a new selling machine on the job—the motor truck."

This statement, made by Daniel Burkhartsmeier, president of a cooperage firm of Chicago, indicates the position gained by the motor truck to-day. Once regarded solely as a delivery medium, the motor vehicle has proved to be a business stimulant in many cases.

Mr. Burkhartsmeier, who experimentally purchased a 5-ton Pierce-Arrow motor truck in 1914, found that the vehicle multiplied his business field eightfold. He now operates one 5-ton and six 2-ton units. His factory, located about eight miles south of the Chicago "loop" district, limited deliveries to that distance in the days of horses. Now deliveries are made 12 miles north of the "loop" and as far as South Bend, Indiana, 65 miles from the plant.

"Motor trucks cover a much larger area, enable quicker deliveries, permit a faster turnover, effect the economy of a larger production fostered by them, and give us direct advertising through their presence on the streets," said Mr. Burkhartsmeier.

The firm's larger machine has a capacity for 150 barrels. Formerly it was uneconomical to deliver less than a carload lot, 500 barrels. Now, instead of two, three or even five-day freight service, barrels can be delivered the same day they are ordered.

"In fact, during the freight car shortage of the winter of 1917-1918, motor trucks literally saved our business," said Mr. Burkhartsmeier.

Mules to Leave Poor Farm

The Board of Supervisors of Peoria County, Illinois, has voted to abolish horses and mules and substitute motor vehicles. "We think that the condition of the horses and mules that we have upon the county farm is such that they must be replaced by new. By purchasing a tractor, the work performed in the past by horses can be done more speedily and more satisfactorily," was the report of the committee. The board adopted the report.

Motor transportation of passengers, express and freight by trucks between Staunton, Macoupin County, Illinois, and Livingston, Madison County, a distance of ten miles, is proposed and a certificate of convenience and necessity has been applied for.

Co-operative Bureaus Are Big Aid to Haulage Men

FIVE CITIES NOW HAVE ORGANIZATIONS

At last to do away with cut-throat competition and to put operating costs on a systematic basis of computation have come the motor truck transportation associations in our largest cities. The average small motor truck cartage man has not always been a good business man. Repairs, insurance, depreciation and operating costs have not always been figured out intelligently, many of the items not at all, with the result that many times profits on a fairly considerable investment have been almost negligible.

"The advantages of such associations can not be overestimated," declares M. L. Pulcher, vice-president and general manager of the Federal Motor Truck Company, Detroit, Michigan. "Detroit, Chicago, Cleveland and New York have such associations and Pittsburgh cartage men have just organized one. The organization in Detroit found that there is business for all on a profitable basis through coöperation. It is solving the return-load problem through reciprocity and the operation of a return-load bureau, doing coöperative buying, studying operating costs, giving free information service, waging war on price-cutters, conducting a clearing house for motor truck interests.

"The mutual exchange of business is the most important feature of its coöperation. A member who has more business than he can handle for the day sends down to the bureau the name of the person who desires service and the capacity of the motor truck desired for the service. The idle motor truck owners for the day are listed. They are given the opportunity to take the work in the order in which they are listed. There is no charge. Thus is eliminated the idle hour. Night schools are also conducted by the association. In these organizations we have the possible solution of ruthless competition. It is constructive cooperation, the experience and knowledge of trucking all possess becoming the common knowledge of each."

Firestone Sales Increase

Firestone sales are now moving at a $150,000,000 a year rate, and this figure is the goal set for the coming twelve months, it was announced on December 15 at the annual meeting of the stockholders of the company at Akron. Reports showed sales for the year ending October 31 were $91,078,513.70. This is an increase of 20 per centum, or $15,277,006.91, over the previous year.

Trucks for Fast Freight

That the motor truck can deliver freight in better time than the railroads was recently demonstrated in California. Between Los Angeles and San Francisco motor trucks have delivered freight from consignor to consignee in 55 hours or less, while it sometimes takes a week or ten days to deliver the same freight by railroad trains, which in addition necessitates its being hauled several times before its ultimate delivery. While in this particular instance the highway between the two cities mentioned is ideal for maximum time, it nevertheless demonstrates the fact that if the proper highways and byways are built, the motor truck can hold its own in competition with any mode of transportation on land, both as to time, dependability and low expense.

Motor Trucks Applying Speed to Building Trades in Many Cities

"To meet the demand for economy and speed in renewed building operations throughout the country, motor trucks increasingly are being pressed into use," said an official of the Pierce-Arrow Motor Car Company, of Buffalo.

Typical instances of enterprise shown by building supply dealers who are increasing the volume and range of their business through the use of motor trucks may be cited in the case of two Milwaukee firms. One, the W. H. Pipkorn Company, operates three 5-ton Pierce-Arrow motor trucks. One of them is in its ninth year of service, performing as reliably as ever, with its original worm gear intact, after 120,000 miles of usage. The Pipkorn company has found that each motor truck replaces 6 teams of horses, increases the radius of operation fourfold, and affords customers immediate deliveries.

During a recent month, one of the power wagons in 25 working days traveled 1,204 miles, an average of more than 48 miles daily, and hauled an average of 21.2 tons daily of cement and other materials. This record has been exceeded frequently. Gasolene yields about four miles to the gallon.

Another Milwaukee firm is the Western Lime & Cement Company. A 5-tonner in operation since February, 1917, has traveled nearly 30,000 miles and has been virtually free from mechanical troubles. During four recent months this machine averaged 47 miles a day, hauling 149 barrels of cement. The total mileage for the period was 4,704, 14,945 barrels of cement being hauled.

No Horses; Sells Barn

A new company capitalized at $50,000 has been organized in Altona, Illinois, for the handling of tractors, plows, supplies, etc., and will be in full operation in a few weeks. The fine, large livery barn of Charles Youngreen has been purchased and will be the home of the enterprise. The building will be remodeled and enlarged and will be arranged for the handling of the machinery to the very best advantage.

A line of trucks between Philadelphia and New York is reported to be hauling freight in 5-ton loads at 70 cents per hundred pounds. The regular express rate is 99 cents. While the freight rate is only 33 cents, there must be added to this a cartage charge of 25 cents at either end of the line, making the total 83 cents. This is 13 cents more than the truck rate.

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Tramp Truck Benefactor to Town When Put to Work on City Woodpile

During the recent coal strike, many cities in the Middle West were hard hit and coal was scarce. Fuel administrators were appointed and coal delivered only after a careful investigation into the merits of every application. In Columbia, Missouri, the fuel famine was especially severe, main reliance being placed on wood because no coal was at hand. Several miles from the city there was a plentiful supply of wood, but no transportation to haul it to Columbia. At this juncture a three-ton demonstration motor truck of the Goodyear Tire & Rubber Company entered town, on its tour of several states to show the worth of motor trucks to farmers. Its use was immediately offered to the fuel administrator and with the assistance of 20 men to load, all the available wood was carted to the central depot in one afternoon and much suffering saved Columbians in need of fuel.

Hall Leaves Bethlehem

Howard B. Hall, vice-president of the Bethlehem Motors Corporation, and director of the export activities of the corporation, has resigned, to become effective February 1. Mr. Hall was one of the first to join Arthur T. Murray in the organization of the Bethlehem Motors Corporation in 1916, severing his connection with the Brady Murray Motors Corporation, at the time eastern distributers of Chandler cars, to become assistant general sales manager of the Bethlehem Motors Corporation. Later, after being prominently identified with the development of the company's success, Mr. Hall, while retaining his factory interest, organized the Chicago Bethlehem Sales Company, for the distribution of Bethlehem motor trucks in the Middle West, becoming active as president of the distributing corporation for a year and a half. He returned to New York early last year and became actively engaged in the export efforts of the company. While a young man, Mr. Hall's experience dates back through a number of years in the industry. He was also at one time eastern representative of the Pacific Mail Steamship Company, and later a member of a prominent exporting company, specializing in motor trucks, which experience has made him an authority on foreign trade conditions, especially in the Far East. Mr. Hall states he will take a short vacation before announcing his future plans.

Davies With Seelye & Brown

Maxton R. Davies, vice-president and secretary of the Dunlap-Ward Advertising Company, Cleveland, and former manager of that agency's Detroit office, has returned to Detroit to become a vice-president of Seelye & Brown, Inc. He will serve as counsel on automotive advertising and sales. Mr. Davies is well known in the automobile and allied industries, having been prominently identified with the advertising of Chandler, Cleveland and Grant motor cars.

Motor Trucks Speed Up Logging Camps

Power Wagons Lower Costs, Haul Greater Loads and Reduce Lumber Costs in Many Ways

IN the logging camps, at the sawmill and in the retail lumber yards the motor truck is giving striking proof of its usefulness and economy. Its capacity for greater loads, its extreme mobility, its tireless energy have already effected remarkable changes in taking out the logs and in distributing the finished lumber. Some authorities believe it will entirely supplant the horse in this field. Others say it has already revolutionized the industry.

The Barker Logging Company's camp at Bellington, Washington, has been using motor trucks successfully and profitably for over sixteen months. In one day 65,000 feet were handled from the loading point to the dump, a mile and a half away, with three 5-ton motor trucks. The timber that this concern is taking out is fir logs, running from three to six feet or more in diameter. While the Barker company originally installed motor trucks because of the difficulty of getting steel rails, it is now their belief that the power wagon is as cheap as the railroad as far as operating costs are concerned, and the initial cost of the railroad would have been much greater.

At the sawmills of the Northwest motor trucks ranging from 1-ton to 3½-tons are being extensively used. In the yards the small machine has shown that it can do the work of several horses. Data on deliveries based on a number of instances show that a motor truck has the capacity of not less than two teams and saves the wages of one man.

A Michigan lumber company has kept close records of trucking costs. A 3½-ton motor truck is used with a 6-ton semi-trailer. In moving logs from the rural district to the plant, 12½ miles, 56,484 feet were handled in 22 days, or an average of over 2,500 a day. The average total cost was $11.91 a day, or it cost $4.25 to move each 1,000 feet a distance of 12½ miles. By any other power it would have cost $12 per 1,000 feet.

An Oklahoma retail concern reports that with three 2-ton motor trucks and one smaller size they handled a business that would require 20 teams. Taking into consideration the investment in motor trucks and the investment in teams and wagons, they state that they have cut their drayage costs more than 40 per centum.

The value of the trailer as an adjunct to the motor truck in lumbering should be clearly understood. At little additional expense a trailer or semi-trailer by greatly increasing the capacity of a load, will cut down expense considerably. Where timber to be hauled is of great length the trailer is a necessity. A Pennsylvania company uses a 5-ton motor truck and a 2-wheel trailer for mine props which run from 30 to 55 feet in length. These loads average between 8 and 12 tons and are brought over mountains with grades as high as 7 per centum.

Ship-by-truck responds to the demands of an era of reconstruction. It links new productive areas of timber, which the railroads have not reached, to the markets of trade. It offers unprecedented opportunities to the lumberman to put his haulage on an efficient basis, to speed up production and to expand his business.

"Mack Bulldog" Magazine Is to Be Issued by International Motor Co.

D. O. Skinner, advertising manager of the International Motor Company, manufacturers of Mack motor trucks, announces that plans are completed for the "Mack Bulldog," a new trade magazine to be published by this conmpany.

The publication, edited by H. C. Bailey, formerly manager of the Mack branch in St. Louis, will be most comprehensive and elaborate, the size being 9 by 12 inches and profusely illustrated throughout. It will be published in the interests of motor truck owners and operators, and will contain articles and illustrations of interest to every one in the motor truck industry. The adaptation of the motor truck to the different fields of business will be a prominent feature of the magazine.

Five Trucks Displace 40 Mules in 72-Mile Daily Haul of Grapefruit

That motor trucks are superior to horse-drawn transportation method for speed, weight of pay-load and cost is generally conceded. The replacement of horses by motor trucks has been so rapid that practically nothing but gasoline-driven vehicles are seen on city streets and country highways. A motor truck equipped with pneumatic tires will pay for itself in five months, according to a statement of John S. Taylor, fruit grower, of Palmetto, Florida. His five ¾-ton motor trucks replaced 20 mule teams and drivers, hauled 240 boxes of grapefruit a distance of 72 miles daily at a cost of 3 cents a box against 10 cents for mule team. The speed of 10 to 19 miles an hour over asphalt and also deep sand allowed the packers to work full time instead of waiting for mule teams to arrive.

Opens Permanent Display

The J. I. Case Plow Works Company announces the opening of display and salesrooms in the Grand Central Palace, New York City. An extensive display of Wallis tractors and J. I. Case implements is being arranged for. Beverly M. Value, foreign representative for the J. I. Case Plow Works Company, is in charge. When visiting New York everyone interested in the farm machinery market is cordially invited to call at the Grand Central Palace and see this display of modern farming implements.

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Motor Wagons Celebrate 22nd Birthday in April

FIRST AMERICAN CAR SOLD IN 1898

Next April will celebrate the twenty-second anniversary of the first sale of a motor vehicle in the United States, because it was in April, 1898, that an American manufacturer made the sale to an individual which was the forerunner of the sale of 1,800,000 motor vehicles during the past year. The development of this wonderful industry has occurred within the recollection of the present generation and is a manifestation of the indomitable perseverance and real progressiveness of the American people, according to Charles Clifton, president, National Automobile Chamber of Commerce.

"The history of the motor truck," continued Mr. Clifton, "antedates the passenger automobile. Gugnot, in France, Hancock and Russell in England and Owens in America designed their self-propelled vehicles for commercial purposes. Gugnot's first venture was a machine to haul heavy artillery. Hancock's and Russell's machines were designed as commercial stages, while Evan's experiments aimed at a practical road wagon. The passenger car came as such only after the pioneer experiments of Daimler and Benz in the year 1885. The possibilities of commercializing the automobile were perceived by many of the American pioneers. While the exact origin of the commercial car is somewhat obscured, evidence seems to favor Charles S. Woods, a carriage builder, of Chicago, as the first manufacturer. His cars were run by electricity.

"By placing a paneled delivery body on their passenger car chassis, the Winton Company in 1899 produced a commercial car which was sold to the United States Postoffice Department. In the next few years there was a great development of electric, and in a lesser degree steam trucks. Until 1906 the tremendous activity of the passenger car manufacturers obscured the potentialities of the commercial vehicle, but in this year came general recognition of the arrival of the motor truck. It may be said that at this time the manufacture of the commercial car became a distinct industry.

"There are now about 550 or more vehicle manufacturers in the United States, who, with 6,789 concerns manufacturing some article used in the automobile trade, employ more than 830,000 persons, half as many as are employed by all the railroads and appromixately 8 per centum of all the people engaged in manufacturing and mechanical industries. The number of persons dependent upon this industry is almost 3,000,000. There are in use in this country alone more than six million, four hundred thousand automobiles and approximately six hundred thousand motor trucks. These motor vehicles have paid to the states almost $60,000,000 in fees during the past year.

"The motor truck has invaded over four hundred different trades. Its value has become so generally recognized that practically no industry or trade is not included in this list. In a compilation of 38 trades, made January 1, 1918, by POWER WAGON, it was found that there were 8,171 fleet owners operating 67,446 vehicles and 115,105 individual owners operating 271,742 vehicles. These 339,188 cars had a value of $929,980,000."

Betz Has New 2½-Ton Model

The Betz Motor Truck Company of Hammond, Indiana, manufacturers of worm drive trucks, has a new 2½-ton model. The engine used is the HU DUBA 4¼x5½. The motor accessories are Bosch magneto, Stromberg carburetor and Pierce governor. The lubrication of the Buda motor is of full force feed with a drilled crankshaft. The power of the engine is transmitted through a Brown & Lipe disk clutch and four-speed transmission which are directly connected to the motor; then through a tubular propeller shaft with three Peters 3½-ton joints. Final drive is through a Timken worm-drive axle. The front axle is also of Timken make. The Chicago improved tube and fin radiator is mounted on springs. Standard steel wheels equipped with 36x4 and 36x7-inch tires are used, and Ross steering gear with 202 wheel. The Parish and Bingham cold pressed steel frame with five cross members is six and one-sixteenths inches deep. The standard equipment includes stormproof cab with curtains, Pierce governor, gas headlights, gas tank, steel fenders and running board, explosion whistle, jack and tools. Optional equipment consists of electric system, pneumatic tires, hand and power hoists and bodies of any kind.

Faulkner With Moreland

Herbert A. Faulkner has recently been appointed advertising manager of the Moreland Motor Truck Company, of Los Angeles. Mr. Faulkner has had wide experience as a practical daily newspaper and advertising man in the East. He was especially known through his originality and initiative in the conduct of his department as general passenger and advertising agent for the Bay State Street Railway Company, of Boston, being in charge of all advertising, publicity, promotion of traffic and public relations work for that company. He was also secretary of the New England Street Railway Club and editor of its various publications, including the Street Railway Bulletin, a technical trade journal. Mr. Faulkner, like many another, came to Southern California on a vacation, saw the country and was conquered.

Decatur Dealers Organize

The Automobile, Truck, Tractor, and Accessory Dealers of Decatur, Illinois, have completed an organization and elected the following officers: President, B. B. Burns; vice president, A. H. Drysdale; secretary-treasurer, R. M. Tenney. It was voted to affiliate with the State and National associations. The association starts out with thirty members and will meet twice a month.

Navy Joins in Good-Roads and Ship-by-Truck Cruise

COURSE COVERED PART OF THREE STATES

CINCINNATI, Jan. 19.—Sailors of the United States Navy recently embarked on a recruiting cruise, overland, through three states, Indiana, Kentucky and Ohio, on the good ship "Motor Truck." The cruise covered about ten days, the port of embarkation being the Firestone "pier" on Eighth Street, Cincinnati, stops being made at Hamilton, Middletown, Dayton, Franklin, Oxford, Venice, Georgetown, New Richmond, Hillsboro, Washington Court House, Ohio; Covington, Newport, Walton, Independence, Georgetown and Lexington, Kentucky; Lawrenceburg, Aurora, Rising Sun, Liberty and Indianapolis, Indiana, and way points. On board at the time of embarkation were a band composed of 25 veterans of the world war, under the direction of Anton Marovec, U. S. N.; speakers from the Cincinnati Chamber of Commerce, and members of the Hamilton County Good Roads Organization, which is being organized by W. T. Calerdine, chairman of the Good Roads Committee of the Cincinnati Automobile Club, and speakers from the Firestone Ship-by-Truck Bureau. The entire demonstration was in charge of Chief Printer R. B. Moon, U. S. N., and the primary object of the cruise is to interest the youth of the cities and towns visited in the navy. The secondary object of the cruise is to preach the doctrine of the ship-by-truck movement as a patriotic and economic factor in the welfare of the country. Band concerts were given at all the points visited and speeches were made advocating the advantages of the motor truck in the handling of freight. Pleas for the building of good roads as an aid to the power wagon and reducing the high cost of living were prominent features of the demonstration.

Much enthusiasm was aroused all along the line, as the visit of the demonstration was extensively advertised through newspaper publicity.

After the first two days of the trip, the weather became so inclement that it was deemed necessary to supply the crew with a closed body motor truck, and a record run was made by a Packard 3-ton machine from Nashville, Tennessee, to Cincinnati, the trip requiring but twenty road-hours.

Batenburg With Mitchell

Interest is attached to the report given out by the Mitchell Motors Company, Inc., of the appointment of P. J. F. Batenburg, M. E., as chief engineer. The immediate building up of a strong and progressive engineering department under his guidance will round out an organization already famous for fine manufacture and body design.

A Chicago express company has eliminated six or more days in the hauling of furniture to points within 300 miles of the city, by routing it in motor trucks instead of by rail.

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Big Stores Again on Full Delivery

Plan of "Carry Your Own" Not Popular Since War-time Need of Conservation Has Passed and Department Store Fleets Are on the Increase

DEPARTMENT stores, which have been fairly well out of the market for delivery machines during the past year or two, probably will be back with renewed force in the near future, as the result of developments in that field.

The experience of L. S. Ayres & Company, operating a department store in Indianapolis, is probably typical of the industry. The company, which keeps a careful record of the number of deliveries made, reports that this service is getting back to the pre-war basis with striking rapidity.

During the war the public was urged to economize in every possible direction, particularly in releasing equipment of all kinds for war work by doing its own carrying as far as possible. The result of this campaign was far-reaching in Indianapolis and most of the other cities of the country. Ayres, for example, found its need for motor trucks halved. Nineteen vehicles in use before the war quickly dropped to a total of eight used during hostilities, these being utilized chiefly for heavy articles, such as furniture.

Since the signing of the armistice the public has gradually drifted back into its old habits. Recently it has shown even more disinclination to carry its own packages. For instance, Ayres had seventy special delivery packages in one afternoon recently, the customer being willing to pay ten cents extra for immediate delivery, rather than wait until the following day and get free service. Ayres' deliveries in July, a light month, were 13,000, as compared to 41,000 in July, 1916. The November total was around 40,000. The opening week of November showed more than 1,000 increase over the corresponding period of 1918.

THE company makes no effort to discourage requests for delivery, though it does require patrons to pay a premium for quick service. It has its delivery department standardized, so that chauffeurs never work later than 6 o'clock, even on Saturday. Hence, it objects to the special delivery request, which tends to break up the schedule on which the motor trucks operate. For instance, the territory near the heart of the city is reached regularly by the machines in morning deliveries, while the outlying sections are visited in the afternoons. On occasion, delivery trucks may drop a package in the afternoon on the way to their real field of operations, but as indicated, the practice is not encouraged.

The delivery service of the department store, while probably as efficient as any in the country, is operated at less expense than most, it is believed. The use of bundle boys on motor trucks was discontinued recently, after experiments made a year ago last Christmas. So difficult was it at that time to secure capable boys to assist the chauffeurs that the company decided it might as well try to struggle along without them one time as another. Consequently, during the Christmas rush, the drivers worked alone. The loss of packages, fear of which was the chief reason for the employment of boys, was so small that it was negligible. Only four bundles were stolen during the week. The loss in aggregate was small, especially in comparison with the weekly stipend of $12 or $15 for each of the eight boys.

The new policy made a bit more work for the chauffeurs, of course, but this was made up by the employment of a bonus system. During the holidays the men were given a bonus of $10 a week, and since that time a regular premium of $5 a week has been paid for good service. To obtain the extra payment, however, the drivers have to deliver 100 per centum service. They either get the bonus or they don't get it. There is no middle ground, and one complaint from a customer is sufficient to kill the claim for the extra amount.

DRIVERS are required to leave a slip under the door of the patron whenever a bundle is taken back to the store, left with a neighbor, or otherwise disposed of except in the only satisfactory way, which means delivered. It has been found that neighbors will keep bundles for an indefinite period, and the only remedy is to notify the buyer of the disposition made of the purchase. Where a bundle is delivered to a hotel, or in any other case passes through the hands of a third party, the chauffeur must secure a receipt giving the name of the person receiving the package.

While chauffeurs also are warned about ringing bells repeatedly before the housewife has time to reach the door, and about carelessly cutting across lawns, as well as carrying friends around town on their machines, Ayres & Company have not neglected the chance of mistakes originating inside of the store. All bundles go to the credit department of the store before they are turned over to the drivers and men familiar with the names and addresses of the store's customers scrutinize the addresses carefully. If an address is wrong, the saleswoman who made the mistake is called in and invited to discover the correct street number. Telephone books and directories are placed at her disposal, so that the task is not a difficult one. Employes do not care for the special trip upstairs, however, and mistakes are held to a minimum since the new rule was put into effect.

As a result, economical operation of motor trucks is secured. They are not sent running to houses with packages which were not ordered, and do not lose time on the road in rectifying mistakes made at the store.

The company is particularly emphatic in its instructions to its chauffeurs to report car trouble as soon as discovered. Its experience has been that a trouble quickly mended amounts to little, but that if it is allowed to take care of itself for a week or so, real damage to the car is the result. The company maintains its own garage and enough helpers to keep the machines in good shape.

Under the system of charging depreciation, all of the motor trucks have been wiped off the books. Most of them are six or seven years old, and while they are doing good service, the company probably will invest in others in the near future. And the situation of L. S. Ayres & Company is probably identical with that of scores of other big department stores throughout the country.

Trucks Aid English Roads

The extent of the congestion upon the railways in England is probably beyond adequate description. Nearly everybody in business there knows of one or more specific instances of merchandise held up; but it is difficult from such industrial experiences to form any clear idea of the handicap under which industry is laboring on account of the present transport conditions. Motor road vehicles are being called upon to assist the railways and to ease the situation generally. One thinks of motor transport perhaps in this connection as being utilized in local cartage and short hauls; but these, it appears, are by no means the limits of the aid which the motor truck is rendering to the railways. Shippers are sending every day larger and larger quantities of rail-consigned goods by road. Both the volume and the distances of this traffic are certainly growing. The London & South Western Railway, as an instance, is known regularly to be sending goods as far as from London to Portsmouth by motor road vehicles, and, in exceptional instances, even greater mileages are being worked.

Stogsdill to Logansport

The Republic Truck Company, of Alma, Michigan, has sent one of its officials, L. J. Stogsdill, to Logansport, Indiana, to manage the sales of Republic motor trucks and parts through the Wm. Sprinkle Auto Company. Mr. Stogsdill was formerly manager of a Republic branch service station and from this position was promoted to the sales department.

Springfield Show March 10

The Springfield, Illinois, Automobile Dealers' Association voted to stage the first annual show at the state arsenal on March 10, 11, 12 and 13. Following the decision to put on a show, officers were elected for the ensuing year as follows: President, W. S. Van Duyn; vice-president, M. D. Morris; secretary-treasurer, W. F. Dagon; directors, E. S. Hatcher and J. L. Elliot.

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Aluminum Truck Wheels Stand Test Covering Four Years' Heavy Hauling

Aluminum wheels for motor trucks and passenger cars is one of the recent interesting announcements to the motor car public. Extensive road and laboratory tests made to date indicate the ability of aluminum wheels to stand up under all strains as well as do existing types of wood, wire, or steel. Moreover, important advantages are claimed for the new wheels, due to their reducing of the unsprung weight, which effect important operating economies such as increased pay loading, reduced repairs, saving in tires and fuel and easier riding qualities.

The aluminum wheel has been developed experimentally by the Aluminum Castings Company, under the trade name of Lynite. It is a one-piece aluminum alloy casting made of the new Lynite No. 145. This alloy was recently developed by the Lynite laboratories after years of research and with a specific gravity of only 2.9, a tensile strength of 27,500 pounds per square inch and an elongation in two inches of 4.5 per centum, it is considered the strongest aluminum casting alloy yet produced.

The importance of reducing the weight of the motor vehicles below the springs is generally appreciated and designs reveal the fact that this requirement is being carefully studied. It is obvious that when the motor vehicle is traveling over an irregular road there is a tendency for one or both wheels to break contact with the ground immediately upon striking some obstacle. If the rear wheel leaves the ground it is free to rotate at any speed which the engine may induce, i. e., at any abnormal rate of speed. Consequently, when the wheel again comes in contact with the ground a certain amount of "slip" must occur until its speed conforms with that of the other wheel. As this slip is very detrimental to the tire, causing severe road friction and tire grinding, it is quite desirable to pay every attention to available methods for avoiding such fault.

At first thought it might appear that cars with a large unsprung weight, as illustrated in so-called carry-all types with heavy axles and heavy wheels, there should be a more secure hold on the road than when these parts are of lighter weight. But further consideration will show this thought to be an error. Consider any motor vehicle of any standard spring suspension with a full load. Remove the regular wheels and replace them with typical cast iron railroad wheels. Drive this car at a rapid rate of speed, strike a rock projecting above the road surface and what happens! The wheel will be thrown upward, causing a compression of the springs which will only partially absorb the shock, the remainder of which will be transmitted to the body of the car. Now replace these wheels with a set made of paper mache. Drive this car at the same rate of speed, strike the same rock and what happens! Supposing the paper mache wheel can stand the shock, it will be thrown upward as before, causing a compression of the springs which will again absorb the shock. This time, however, the shock transmitted to the body will be very slight, for the body is so much heavier than the wheel that the springs will drive the wheel downward rather than drive the body up. Aluminum wheels are about half the weight of other wheels.

Sets of Lynite wheels are now on test on five or six different standard motor trucks and to date have shown up very favorably. One set of solid-tire wheels installed over four years ago has averaged 30 miles per day over severe roads and only one set of tires has been replared.

Selden Company Holds Annual Pep Convention for Sales Managers

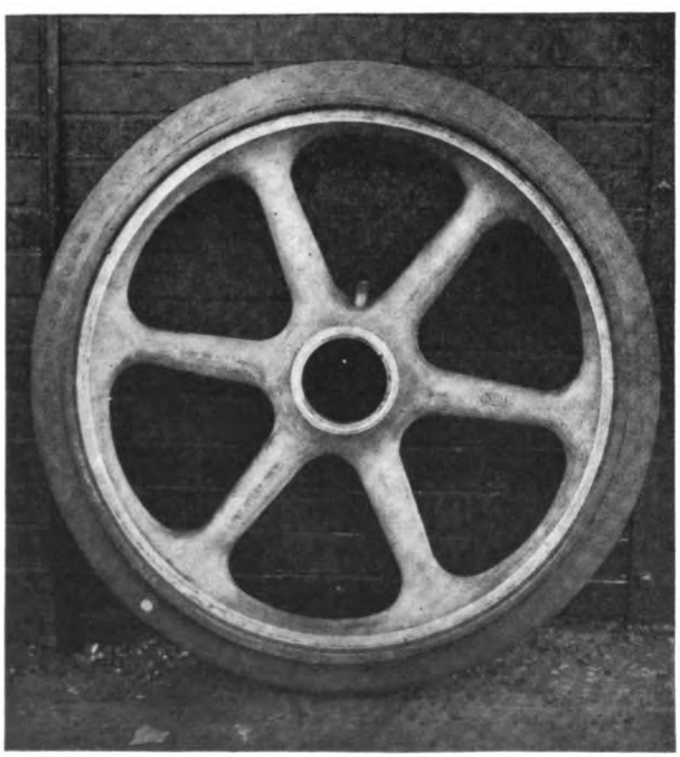
The annual "Get-together Meeting" of field and office men is usually looked forward to as a duty that most men would gladly pass up, but this year the Division Sales Managers' Conference conducted by Hal T. Boulden, sales director of the Selden Truck Corporation, Rochester, New York, was so thoroughly enjoyed and so valuable to all present that it deserves mention.

From the time of roll-call, morning of December 3, to the final wind-up, afternoon of December 6, it was in all truth a "pep" meeting. Long speeches were tabooed and general discussions on the various items were joined by all.

The "truck show" at the factory, and talks on the flexible features of the Selden line by Assistant Manager John R. Coleman, and the discussion by Vice-president Barry and Service Manager Henry R. Selden were much appreciated. Vice-president R. H. Salmons gave an interesting talk on the history of the Selden; President George C. Gordon on Business Conditions; J. E. Pickens, advertising manager, on Advertising; E. A. Shelly, assistant sales manager, on Home Office Coöperation; E. B. Osborne, treasurer, on Accounting Practices, and Vice-president W. F. Reynolds, on Foreign Affairs.

The final feature of the conference was a fifteen-minute interview with each and every officer and department head of the company. At these interviews the division manager could unburden himself to all, from President Gordon down.

Fire which started from an overheated stove recently destroyed part of the plant of the Union Motor Truck Company, causing a loss estimated at $15,000.



Truck wheel made of aluminum.

Aluminum disk truck wheel.

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Packard Chicago School Has 225 Pupils

Instructions for Drivers Meeting with Hearty Support from Motor Truck Owners and Others Interested in Truck's Welfare

"A CHAIN is no stronger than its weakest link." An old proverb that is particularly true of motor truck transportation. The most important link is the driver. He hooks the employer up to the job and determines to a large extent whether the motor truck is a profit or a loss. Realizing some time ago that a driver should be as strong a link as possible the Packard Motor Car Company set out to coöperate with him. Knowing that knowledge of his motor truck and what he could do to make it function efficiently would go a long way towards economical and dependable operation this company started Truck Drivers' Instruction Courses for drivers of all makes of motor trucks. Distributers all over the country have opened these schools and thousands of drivers have been graduated. They are really not schools at all, but a place where drivers can gather to discuss motor truck operations. All the company men present are either actually driving machines or are mechanical experts. They are practical and everything brought up is of a practical nature. Just the problems that confront the operator of a motor truck every day.

No effort is made to make a mechanic out of a man. Ten meetings over a like number of weeks would be too short a time for that. A driver does not have to be a good mechanic, anyway. There are men in the garage to keep his motor truck on the road. He should know how to make minor adjustments, however, and intelligently report trouble when he returns from a trip. The one big point of the course is to show the relations different units of the motor truck bear to each other—the motor to the clutch, the clutch to the transmission, the transmission to the differential and what care these require from a lubrication and driving standpoint. A man may be a wonderful driver so far as steering, applying his brakes and backing up to a loading platform are concerned, but if any trouble develops the majority of drivers cannot tell whether it is in the motor, transmission or differential. Consequently if they are in a place where they must locate the cause themselves they lose a lot of valuable time before they hit the right spot. They also may cause more trouble by changing adjustments which have nothing to do with the difficulty.

THAT the course is practical is proved by the results owners are getting from Packard Star Drivers. Mr. Hutchinson, superintendent of the Sefton Manufacturing Company's garage, and Mr. Johnson of Mandel Brothers' Department Store, are two men who vouch for this. They both say: "Operating expense of any motor truck is based first, upon the maker, second, upon the care or treatment it is given by the purchaser, and third, the care it is given by the driver."

Lectures and discussions seem to be the most successful method of instruction; as the classes are made up of men of all ages from the more mature owner or garage superintendent to the youngest driver. The size of the classes does not permit the use of individual parts by the talker, so stereopticon slides are employed. Parts boards and motor trucks are also used to illustrate points brought out in the discussion. Moving pictures play their part and on feature nights vaudeville acts are billed. The enrollment of the present Chicago course is 225. This includes drivers of all makes of motor trucks, who pass a Packard driving test, similar to the government test before they finish the work. The interest the course creates is shown by the fact that some operators allow their men to go home an hour early on meeting nights to be sure they will get to it on time. The average Chicago meeting starts with community singing for about 25 minutes. Special stunts by the song leader create enthusiasm and friendliness. Immediately following the singing there is a little business talk and then a technical discussion by Mr. Wilkinson, who has been in the automobile business for twelve years.

DURING the day he calls on owners in the Chicago territory relative to monthly inspection and repairs. Thus keeping in touch with all the abuse and neglect motor trucks in this territory are subjected to. He can cite instance after instance where the neglect of a small item has later developed into serious trouble. His statistics show that 90 per cent. of the repairs on motor trucks are due to insufficient lubrication. So, needless to say, lubrication is the one big feature of the course. Anyone is at liberty to ask any questions at any time regarding the operation of a motor truck. For men too bashful to ask questions at a meeting there is a question box. At each meeting mimeographed questions on the subjects to be discussed are passed out and returned answered at the next one. These are graded to determine a driver's qualifications.

The stimulus for regular attendance and conscientious effort is the Packard Star Truck Driver Pin and Certificate. This certificate is good for one year. These can be canceled if the man in whose employ the driver has been for the past year does not recommend him as being a star driver

Following are the rules covering the distribution of these certificates and buttons.

1. Meetings missed during past course can be made up during next course, but a man must attend the meeting corresponding with the set of questions he missed.

2. Certificates will be issued to men attending nine of the business meetings and receiving an average grade of 70 on questions. Papers will be checked very carefully and anyone not making grade can not receive certificate.

3. Buttons will be given to those entitled to certificates, who are driving Packard motor trucks at the present time or anyone not driving a Packard motor truck passing a road test to be conducted by the Packard Motor Car Company on day designated later.

4. Anyone that is not driving but wishes to complete the course will receive a certificate, providing he receives a grade of 70 on the questions and attends nine of the business meetings.

5. In order to obtain button a man must have an Illinois chauffeur's license.

The meetings start promptly at 8:15 at 2357 S. Michigan avenue, Packard Motor Car Company, every Friday. Subjects discussed are: Lubrication, Motor, Ignition, Carbureter, Cooling System, Clutch-Transmission and Differential, Springs and Frame, Steering and Brakes.

U. S. Motor Truck Company Holds Its Annual Sales' Convention

Nearly forty district sales managers of the United States Motor Truck Company were gathered at the annual sales conference of that company, which was held at the factory, Covington, Kentucky, December 17 to 20, inclusive. Great enthusiasm was displayed by the men when the company's plans for expansion during 1920 were made known and the designs for the 1920 models were made known to the organization. New and advanced policies for the conduct of the various departments were explained, and although many were radical departures from former practice in the industry, they met with the approval of everyone present, as each proposed change is one which will tend to advance the company rapidly.

The session closed with a banquet at the Hotel Gibson, Cincinnati, which was presided over by Forrest J. Alvin, general manager of the company, who acted as toastmaster, and whose remarks, as well as those of President R. C. Stewart, made a deep impression upon the mind of every man present. Those in attendance were R. C. Stewart, president; R. S. Stewart, vice-president; F. J. Alvin, general manager, and all of the executives and department heads of the company, as well as the entire force of district sales managers, except those located in the far West. It was the consensus of opinion that never had so much enthusiasm been displayed at an affair of this sort, and never had they known such good cause for enthusiasm.

As outlined at this banquet, the U. S. program for 1920 is an ambitious one. It provides for an increase in production of 200 per centum or better, new forms of sales coöperation with dealers, large use of advertising space in newspapers and other publications and other new and different forms of advertising coöperation, the production of a great share of the material used in the construction of the motor trucks in the U. S. plant, and many other points of interest to the industry which will be disclosed later.

The weak link in our transportation facilities is the inefficient methods of delivering freight to and carrying it from our terminals.

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Trailers Reduce H. C. of Haulage

Half a Billion Dollars Can Be Saved by Adoption of Newest Means of Economical Highway Transportation Trailers and Semi-trailers

MORE than half a billion dollars a year is being spent unnecesasrily in the United States for road haulage by motor truck, according to a calculation made by H. W. Perry, manager of the Trailer Manufacturers' Association of America. Basing his estimates on registrations in the various states, which show more than 600,000 motor trucks in use, and assuming the average capacity of these motor trucks to be 2 tons and the average mileage traveled by them per day to be 50 miles, it is found that they have a daily capacity of 60,000,000 ton-miles—that is, they could haul 2 tons 30,000,000 miles in one day. But the average motor truck or delivery wagon travels empty half its daily mileage, on its return trip. On many trips it is not loaded to capacity, but on the other hand, it is overloaded frequently, and the average capacity of the vehicles in service undoubtedly is more than 2 tons. So an estimate of 30,000,000 ton-miles daily is a fair approximation of the work actually done.

There are 300 working days per year, but nearly all motor trucks are laid up part of the time for repairs, overhauling and painting. Some are operated on holidays and Sundays. An estimate of 265 days' service each per year is believed conservative. Multiplying the 30,000,000 ton-miles daily service by 265 gives a total annual service of 7,950,000,000 ton-miles rendered by the 600,000 motor trucks.

THE cost of operating motor trucks varies with the size of the machines and operating conditions. It runs, roughly, from about $10 a day for a 1-ton motor truck to $20 or $25 for a 5-ton. Based on numerous records of actual operating costs, it is calculated that the cost of haulage by 1-ton motor truck is about 40 cents per ton-mile, by a 2-ton about 25 cents, by a 3-ton or 3½-ton about 20 cents, and by a 5-ton about 15 cents. The greatest number of motor trucks in use are of 1- to 3½-tons capacity; therefore, 23 cents per ton-mile is taken as a fair average of the cost of haulage by motor truck. At this rate the total cost of the 7,950,000,000 ton-miles service is $1,828,500,000 a year.

Tables of operating costs of trailers and semi-trailers as compiled by leading trailer manufacturers from their own experience and that of users show the cost to vary from about 3½ cents to 6½ cents per ton-mile, according to type and size of trailer. This indicates 5 cents as an average, or less than one-quarter that of motor truck haulage; but trailer manufacturers and users generally claim a saving of one-half or more in hauling cost with trailers as compared with motor trucks. To be conservative and well within the probability, an average of 10 cents per ton-mile, or double the estimates of trailer manufacturers, is taken as the basic cost of haulage with trailers and semi-trailers.

Trailers can not be used except with motor trucks or passenger automobiles to draw them, and usually only one is used at a time with a motor vehicle. If every motor truck were to draw one trailer or semi-trailer of the same load capacity as the motor truck, half the total tonnage would be carried on trailers. In practice, a 3-ton semi-trailer is used with a 1-ton motor truck and a 12- or 15-ton semi-trailer with a 5-ton motor truck. Sometimes two 4-wheel trailers are hauled by a motor truck. Thus, three times the load capacity of the motor truck itself is hauled at one trip. But, again to be conservative and on the safe side, it is assumed that only one-half the total annual ton-mileage, or 3,975,000,000, could be carried on trailers. Taking the average ton-mile cost by motor truck as 23 cents and by trailer as 10 cents, there would be a saving of 13 cents per ton-mile. This, multiplied by 3,975,000,000, gives $516,750,000 as the reduction in the annual bill of the nation for motor haulage that could be realized by the universal use of trailers and semi-trailers with the motor trucks in operation to-day.

If the cost of haulage by highway at distances of more than about 50 miles is to be reduced materially and put on a competitive basis with other means of transportation, it is held by Mr. Perry that the use of trailers offers the only solution in sight.

Timken-Detroit Axle Company Plans Broad Expansion for 1920 and 1921

When it was announced a few weeks ago that the Timken-Detroit Axle Company was increasing its capital, it became rumored that the company proposed to consolidate with other interests or to sell its assets. Any report to that effect is erroneous. There is no intention of consolidating or selling to any new interests. The increase in capital was authorized for the purpose of providing sufficient capital to take care of the rapidly growing demand for Timken-Detroit axles. It became quite apparent early in last year that it would be impossible for the company to supply the demands of its customers, but plans were formulated for increasing the output as rapidly as physical limitations would permit. So buildings were started and machinery ordered in June, and the decision made to increase the capital. Of the capital authorized, $5,000,000 of the preferred has been sold, and over $2,000,000 of the cash has been invested in plants and equipment.

At the annual meeting, held at Canton, Ohio, January 5, it was decided that expansion on a much larger scale would be made during 1920 to provide for at least 50 per centum increase in output in 1921. Not only will the output be greatly increased, but it was decided that the company would produce, in its own factories, still more of the important materials which enter into its product, thereby adding greater insurance to its customers, and having in mind greater efficiency and reduced costs. It has been the fixed policy of the Timken-Detroit Axle Company to have at least two sources of supply for all of its requirements, in most cases one source to be its own factories, the exceptions being raw materials and Timken roller bearings. The Timken Roller Bearing Company is now operating two separate and distinct factories to provide insurance against accident at one of the factories.

The Timken-Detroit Axle Company operates its own malleable foundry, steel foundry, forge plant and gear plants, both bevel and worm, having acquired, when the company engaged in the manufacture of worm-drive axles a number of years ago, the exclusive American rights for the famous David Brown, of Huddersfield, England, patented machinery and its latest improvements in type of worm.

The company was organized in 1909 for the purpose of taking over the axle business of the Timken Roller Bearing Axle Company, which was organized in St. Louis over twenty years ago, beginning with the manufacture of roller bearings and roller bearing axles for horse-drawn vehicles, later moving to Canton, Ohio, and engaging in the manufacture of axles for automobiles, as well as Timken roller bearings. This business has now grown to a point where the Timken-Detroit Axle Company furnishes over 120 customers with axles for passenger cars and motor trucks, the schedule for 1920 being 255,000 sets. The plans, as outlined now, will provide for 400,000 sets in 1921. This increase is necessary in order that the demands of customers may be supplied.

It has been the practice of the company to put back into the business each year about 75 per cent of its earnings, so that the invested capital to-day is approximately $18,000,000, represented by the present outstanding $3,000,000 of common stock and $5,000,000 of preferred. It is planned to pay cash dividends on the invested capital at the rate of approximately 6 per centum during 1920.

Attention is called to the fact that but few important changes have been made in the personnel of the managament since its organization. The financial interests of the Timken family are exactly what they were at the beginning of the business, W. R. Timken having resigned as president because he has been inactive in the business for a number of years. He still remains as a director.

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Heartz Out of Moreland

The resignation of Roy D. Heartz as general sales manager of the Moreland Motor Truck Company, of Los Angeles, is a surprise to his many friends and associates throughout the automotive industry. For three years Mr. Heartz, through his enthusiasm, zeal, initiative and knowledge of the business, has been a strong, energizing influence in the rapid progress of the Moreland organization and his retirement will be generally regretted. Mr. Heartz came to the Moreland company after important connections with some of the largest eastern plants in the industry. It is the intention of Mr. Heartz, after his three years of vigorous activity, to take a brief rest from his labors before taking up a new connection in the trade.

Saving a City's Trade

The service that motor vehicles are rendering at congested ports in England is much greater than at first sight appears. R. P. Houston, M. P., writing to the Liverpool *Press*, has shown that many steamers, including two belonging to his own firm, were diverted from Liverpool to other ports to avoid the delay which would have been incurred on the Mersey. These diversions occurred before the fleet of government-owned motor trucks was sent to Liverpool. Since the machines reached that city dock quays have been cleared, steamers have been more quickly discharged, and others, newly arrived, have been able to berth with less delay than a few weeks ago. Thus, the motor vehicles, by relieving the acute congestion, have saved trade to the port of Liverpool. And it has been so at other congested ports.

Starts with 200 Napoleons

James G. Stephenson, who has associated himself with H. C. Naumann, a Detroit commission merchant, and who has closed out his business to enter the motor truck distribtuing field, is a man of wide experience as an all-round worker. Mr. Stephenson and Mr. Naumann have formed the Detroit-Napoleon company, contracting for 200 Napoleon motor trucks for distribution in a wide territory.

Buys Five Motor 'Buses

Five motor 'buses, accommodating forty persons each, have been purchased by the Red Line 'Bus Company, of Collinsville, Illinois, to be used between Collinsville and East St. Louis. The first 'bus, put in use recently, in Collinsville, hauls passengers to the Pennsylvania station and takes children to school. As soon as the road between Collinsville and East St. Louis is hard surfaced the 'buses will operate between these cities.

To Finance Truck Sales

Companies to finance the purchase of motor vehicles are springing up in many cities of Illinois. The Illinois Automobile Security Company and the Central Illinois Securities Company, both of Springfield, Illinois, have consolidated under the name of the American Investment Company with D. L. Barnes as general manager. The concern will supply the money to purchase any kind of a motor vehicle.

Suggest Use of Trucks in French Railway Crisis

PLENTY OF GASOLENE FOR MACHINES

Considerable difficulty is being experienced in France through a transport crisis, owing principally to the shortage of locomotives and coal, while the quality of the latter is extremely poor.

A somewhat original proposition has been put forward by two practical French engineers, who suggest utilizing all the government motor trucks now lying idle in the various *parcs d'autos*, by equipping their present wheels with flanged tires to render them suitable for running upon the main railway lines.

There is plenty of gasolene in the country. It is even stated that there is thirty times more than is actually required for immediate use for motor work or for various industries; consequently, gasolene should serve as and become a substitute for the coal. A motor lorry over a bad road can carry and easily draw a full load of between three and four tons, but when driven upon a railroad the same machine can, without any abnormal consumption of fuel, haul about 40 tons.

The British army in the Cameroons and Nigeria, and the Americans and Germans have proved that motor trucks can be utilized in an eminently practical manner upon rails and can draw enormous loads. The question, therefore, arises as to why the tens of thousands of French and American motor trucks, instead of lying idle and being allowed to rot in mud and to suffer from neglect and exposure to the climatic conditions, should not be converted without delay in the way suggested and thus be at once put to a useful purpose.

No end of chauffeurs have offered their services to drive the "railway lorries," and it is estimated that the locomotive factories could in a very short period supply the necessary flanged tires for the wheels.

These motor trucks can be used either for passenger or goods service upon local lines, while they would gradually tackle the main lines for the transport of goods, even if the "leader" only of the convoy were accompanied by an experienced railway driver accustomed to the signals and other such technicalities.

The transport crisis in France is so serious that it is even officially proposed, should the River Seine continue to rise and thereby completely stop the service of steamers drawing barges full of coal and other necessary goods, to stop the public service of passenger trains between Havre and Paris.

Registers 43,918 Trucks

Massachusetts had a record year as a state in the matter of registrations. With the close of the biggest year in the history of the state there had been registered 197,801 passenger cars and 43,918 motor trucks, an expansion of 23 per centum in the former and 32 per centum in motor trucks. The passenger car registrations were more than double the figures of four years ago.

Lubeck Joins Diamond T

After nearly three years in the army, over a year of which was spent in France and Germany, Major E. M. Lubeck, whose activities before the war in the automobile world placed him in a prominent position, has returned to Chicago and joined the Diamond T. Motor Car Company organization, making his formal bow to the motor truck industry at the New York show.

Major Lubeck brings to the Diamond T. company broad experience in motor trucks, having been in the unusual position of having been able to study, under the severest working conditions, over 35 makes of motor trucks of American manufacture, and all the French, British and Italian motor trucks, used for military purposes, and 14 makes of German motor trucks captured or turned over at the time of the armistice.

Ship by Truck

Cy Perkins is a farmer;
Back in eighteen ninety-three
He drove to town each day
To sell his eggs to you and me.
We got them fresh right off the farm
A dozen for ten cents.
But now—Alas! How times have changed;
The difference is immense.

Cy saves his eggs until he gets
Enough to ship in crates;
The railroad takes them in to town
And charges heavy rates.
They're put in storage—months have passed
Before they reach the store,
And we take home a dozen
At a dollar ten or more.

Not only eggs, but all produce
Costs more and more each day,
Because the growth of cities
Pushed the farmer miles away.
The railroads and the middlemen—
The clever profiteer—
All get their share and that's what makes
The things we eat so dear.

That is the cause—the remedy
Is plainly to be seen:
Just bring the farmer near his trade
By means of gasolene.
Give him good roads and motor trucks,
So he can go to town
Just as before—and then we'll bring
The cost of living down.

—P. L. SNIFFIN,
International Motor Co.

Long Distance Selling Record

What is claimed to be a new long-distance selling record was established when the Packard Motor Car Company, of Pittsburgh, shipped a 4½-ton motor truck to the Island of Guam. The motor truck, however, was purchased by the Pittsburgh-Des Moines Bridge Company, which has a government contract on that island. Guam lies 6,230 miles west of San Francisco, and is 30 miles long by 6 miles wide. The nearest service station is Honolulu, or Japan, at both of which points are Packard shops.

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Progress Checked on Poor Roads

Demand for Vehicles Exceeds New Mileage of Modern Highways; Tounsend Bill, Revised to Embody Sound Suggestions from All Sections of Country, Now Before Congress

MODERN highway construction is not keeping pace with the demand for modern highway rolling stock. Motor driven vehicles are being produced in numbers far beyond the mileage of types of roadbed necessary to provide economic operation. And yet, great as the productive rate of new vehicles may be, it is far below current requirements.

These facts bearing upon the nation's highway transportation problems are being emphasized in highway development circles as additional reasons for expanding the activities of the federal government in highway construction. The measure known as the Townsend bill has been redrawn and reintroduced in congress. Henceforth it is to be known as the National Highway Act. It now embodies all of the features desired by all sections of the country, and in its present form will be pressed to definite action as firmly and consistently as legislative conditions will warrant.

Two main objects—the construction of a national highway system and the creation of a federal highway commission—are sought in the national highway act. It proposes that the commission shall establish, construct, maintain, improve and regulate a national system of highways composed of connecting interstate roads which shall, by the most practicable routes and with due consideration for the principal centers of agricultural and industrial production, afford ingress into and agress from each state. Such national system may include highways to and from important water ports, and highways connecting at the border with the main highways in countries adjoining the United States, but shall not include any highway in a municipality having a population, as shown by the latest available federal census, of five thousand or more.

THE proposed act also provides that the commission may make all necessary surveys and maps in connection with the establishment, construction, maintenance, improvement, or regulation of the national system of highways, and may construct, maintain, improve and regulate any highway which is a part of the national system, or, in its discretion, may contract with any state highway department for such surveys or maps, or for the construction, maintenance or improvement of any such highway in such state. Any such contract with a state highway department shall be based upon and shall include plans, specifications and estimates prepared by the commission, and the commission shall supervise and enforce the performance of such contracts.

It is also proposed that the portion of the national highway system in each state shall equal 1 per centum of the total highway mileage used as such in the state as ascertained by the commission. In every state where such 1 per centum will not suffice to enable the national highway system to afford at least two highways connecting with national highways in adjoining states, the commission shall increase the mileage of the national system sufficiently to provide two such highways. This provision has been included to avoid any semblance of partiality to any particular state.

The commission will be authorized to select as part of the national system any highway which has been constructed by or in behalf of a state or civil subdivision and which accords with a standard deemed by the commission to be adequate for present and probable future traffic, or which in the opinion of the commission, can be reconstructed to accord with such standard. The commission shall value the reproduction cost of any such highway at current prices and wages and shall construct, or may, in its discretion, contract with the state highway department for the construction of other highways connecting or correlating with the national system of a mileage equal in value to the highway so selected, and to pay therefor out of the appropriation to be made for the construction of the national highway system.

ONE of the provisions of the proposed act is that no money so appropriated shall be expended in any state until the legislature of such state assents to the provisions of the act and to the taking over by the commission of existing state roads or rights-of-way as a part of the national system, except that until the final adjournment of the first regular session of the legislature held after the act takes effect, the assent of the governor of the state shall be sufficient to authorize such expenditures.

In consideration of the benefits to be derived by each state from the establishment of a national highway system, a condition precedent to the construction by the commission of any highway selected as part of the national system in such state, is that the existing right-of-way on the route of such highway shall be transferred by the state or the proper civil subdivision thereof to the United States as fully as may be permitted under the constitution of the state.,

That only such durable types of surface and kinds of material shall be adopted for the construction and repair of any highway which is a part of the national system as will adequately meet the existing and probable future traffic needs and conditions. The commission will determine the types of construction and reconstruction, and the character of improvement, repair and maintenance, in each case selecting the type and character best suited for each locality, proper consideration being given to the probable character and extent of future traffic. The commission is to be charged with the duty of establishing an efficient method of maintenance for all highways comprised in the national system which method shall be adequate for the needs of the traffic affected and shall set aside such sums from the appropriations provided as may be necessary.

It is proposed that all highways in the national system shall, unless in the opinion of the commission, rendered impracticable by physical conditions, excessive cost or legal obstacles, have a right-of-way not less than sixty-six feet wide and a wearing surface of an adequate width which shall not be less than twenty feet.

IT WILL be a part of the commission's work to encourage a more general use of public roads and highways and to collect, publish and disseminate for the benefit of all sections of the United States, useful information on highway transportation, construction and maintenance.

That for the purpose of carrying out the provisions of the act, it is proposed to appropriate $50,000,000 which shall become immediately available; $75,000,000 for the fiscal year beginning July 1, 1920, and $100,000,000 for each of the three succeeding fiscal years, in all $425,000,000, which shall be available until expended.

It further provides that after deducting the running expenses and cost of maintenance, the commission shall annually apportion the remainder of each appropriation among the states in the ratio that the mileage selected in each state bears to the total mileage selected in all the states.

Wichita Show February 23

The Wichita Motor Trade Association, with a membership of more than forty dealers and accessory houses, has chosen the week of February 23 for its annual automobile show. Leases have been taken on the Forum and Exposition Halls with a total floor space of more than 100,000 square feet. It is expected that the Wichita Show will rank with the largest local shows in the country, most of the dealers having been promised the active coöperation of their factories.

Duplex Adds New Dealers

The Duplex Truck Company, Lansing Michigan, advises that they have just completed arrangements whereby the Lawrence Motor Sales Corporation, New York, will handle the complete Duplex line of motor trucks in New York and a considerable surrounding territory. Another addition to the list of Duplex dealers is Lampee & Hitchcock, Inc., 33 Brookline Avenue, Boston, Massachusetts, with whom arrangements have just been completed.

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Packard Discards Tonnage

(Continued from page 17.)

is misguiding to the buying public," says the announcement. "The old system of factory tonnage ratings confuses the problem of motor truck transportation, and in condemning it we are clearing the way to a better understanding of motor truck performance.

"What can be expected of a '3-ton' truck? The term implies that it is the only adequate vehicle for a 3-ton load; that it will carry the 3-ton load efficiently from one point to another, regardless of conditions. As a matter of fact, the load may best be hauled on a motor truck ranging from 1½ tons to 5 tons, depending entirely on the conditions existing where the hauling must be done. At its best, the factory tonnage rating is a crude estimate of motor truck performance, and the automobile industry can no longer tolerate crude estimates.

"By building into our motor trucks a large factor of safety, and by putting our transportation engineers at the service of purchasers, we have done much to remedy the evils of misunderstanding springing from the old system. The elimination of factory tonnage ratings is the next logical step. In other words, we are going directly to fundamentals. We shall take each motor truck sale as a distinct problem in hauling, and our engineers will advise the purchaser as to the machine he needs to meet his individual requirements. One of the first benefits of this new system will be the minimizing of over-loading, which is the most common abuse to which motor trucks are subjected, and which is largely due to the lack of definite information on motor truck performance.

"Packard motor trucks will carry their rated loads whether conditions are good or bad, but a purchaser whose conditions are good should not be led into buying more power wagon and more reserve performance than he needs. On the other hand, the purchaser whose conditions are unusually bad should be made to realize that a good measure of reserve performance will insure him against wasteful depreciation. Any system of rating that does not take into account the variety of conditions under which motor trucks are to work is inadequate."

Hereafter all Packard motor trucks will bear a plate on which will be stamped the name of the purchaser and the duty for which the motor truck is sold. In case of re-sale, the Packard engineers are to be consulted for the purpose of giving a new rating to the motor truck if the change in conditions requires it.

Tractor Aids Logging

The tractor is successfully supplanting horses in logging operations. The Scott & Hoke Lumber Company has shown by tests that a tractor can haul 4600 feet of logs while a team can haul but about 1200 feet. Gasolene-engine propelled tractors in logging use have been fitted with calks on the crawler shoes similar to those used on horseshoes for winter service.

Plans Federal Law to Make Truck Routes Feeders to Trunk Railways

Development of motor truck routes as the short line railroads have been developed, as feeders to the railroads, with through bills of lading and a division of the through rates, is well worthy the consideration of Congress. The use of motor truck routes as an aid in transportation is in process of evolution, and I believe it will be a big factor in the future.

I expect to lay this suggestion before the committee on interstate and foreign commerce when it meets to take up the question of what is to be done with the railroads, as I believe that the motor truck routes should be encouraged as links in our transportation system, keeping pace with the development of good roads both by the Federal Government and the states.

My line of thought is that the motor truck routes might be treated when established and when the population and volume of traffic warrant just as feeders or short line railroads are treated, giving the motor truck line a division of the through rate, also applying the through bill of lading to traffic originating on the motor truck route to be transported by trunk line to destination or applying it in reverse order on traffic originating on trunk lines to be delivered to destination on the motor truck line.

I have the utmost confidence in the ultimate development of motor truck service, and believe that we might properly legislate with regard to this new service.

At present it is in its infancy and routes are established and sometimes fail because they are in a location where the amount of traffic does not warrant, because they have not a scientific schedule of rates, because the collection and distribution ends have not been worked out, or because their rates are too high or too low. Proper legislation can correct this.

New Style Fish Truck Proves Worth In 6-ton Trips Over Soft Ice

A new form of motor truck is being put into commission at the Dormer Fish Company's fish house in Menominee.

The machine itself is equipped with two pairs of runners in front, on which the weight of the motor truck rests. To the chassis of the car there is a steel construction to which the rear axle is attached. A lever alongside the car enables the rear wheels to be raised or lowered. This was found to be necessary as the cogged rear wheels would be pressed into the ice so deep that the engine would not be able to lift them out, causing the engine or some other part of the machine to give.

When about to start the rear wheels furnished with sharpened cogs are allowed to rest on the ice. As the machine gets under way they are raised so that they barely touch the ice. The more power that is needed the lower down are the wheels allowed to go, getting a good grip on the ice. The truck itself is not loaded but is used to pull trailers only. It has made trips through slush and poor ice with a load of about six tons on its trailers.

This new venture promises to make a large improvement in the fishing industry of Marinette and Menominee. Though still in its experimental stage its practicability has been demonstrated.

Horseshoer's Harvest

Horseshoeing is not a lost art, and old Dobbin staged a wonderful comeback in northern Ohio following the recent sleet storm. Blacksmith shops almost on the verge of complete extinction enjoyed a spurt of business almost without precedent since the motor car came into such universal use. One Port Clinton blacksmith alone turned out 142 shoes in one day, his day's receipts being $116. This is the largest number of shoes turned out in a single day by a local shop for many years.

The price of horse shoes at the present time varies from 60 cents to $1.20 per shoe, according to the kind and weight, thus proving that the almost extinct horse shoe business has not been slighted by the H. C. of L. Farmers can remember the time when horses were shod for from 15 to 30 cents a shoe.

Contest Blanks Ready

Entry blanks and prospectuses have been issued for the First National Motor Truck Reliability contest to be run under sanction of the American Automobile association and under the auspices of the Omaha Bee, which has underwritten the event. The entry blanks may be secured at the offices of the Contest Board in New York, the Omaha Bee at Omaha where S. P. La Due, resident manager, has his offices, at the office of the general manager, Charlie P. Root, 2204 Michigan Avenue, Chicago, and at the Detroit office of F. Ed. Spooner, promotional manager. Accompanying the entry blanks is a map of the route of this "Run Around the Money Belt" covering 2,500 miles in a total of approximately 28 days which covers three Sunday resting stops.

Tractor Aid to City

Interest in the various uses to which tractors and other power machines may be put is increasing in Alabama. At Montgomery the city government has just invested in a combination tractor-truck for use in the engineering department.

The city engineer intends using the tractor truck in hauling paving material and other heavy loads about the city. The rear wheels are particularly large and broad, and on account of the excessive weight, it is planned to use it as a road roller as well.

The city also is daily expecting the arrival of a combination street sprinkler and sweeper recently purchased for use in the sanitary department. It is only through the use of labor-saving machinery that the city government can meet the demands upon it for service in this period of high-priced, scarce and incompetent labor supply.

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Need of Makers to Start School

By G. D. WILCOX
Director of Sales and Advertising, Commerce Motor Car Company

ARE motor trucks selling themselves to the ultimate consumer in spite of the present merchandising methods as employed by the average retail motor truck salesman? Can credit for the tremendous volume of sales be given to motor truck salesmen or must it be chalked up to the operation of the law of supply and demand?

These two questions should be uppermost in the minds of sales executives of vision. Whether the automobile truck industry will make the most of a situation and wiggle through, letting the future take care of the question or allow a certain few manufacturers to take the question of training retail motor truck salesmen seriously remains to be determined. There is no denying the fact that motor trucks today are being more and more recognized as a time- and labor-saving adjunct to nearly all lines of industry; that their sales do not depend as much to-day on salesmanship as it will later on when competition becomes keener.

There is no denying the fact that now is the opportune time to train motor truck salesmen in real salesmanship—it would solve many of the alleged evils in the merchandising of power wagons.

Plans should be formulated now to meet conditions which will confront the retail of motor trucks when the industry returns to normal conditions. The motor truck salesman stands on the firing line, he will be responsible for the manufacturer's presentation of his product and for the volume of sales to the consumer.

WITH the possible exception of one or two keen visioned manufacturers no real serious consideration has been given by the manufacturer to the most important detail of taking a first-hand interest in the proper training of the salesmen who make up the staff of motor truck dealers.

Should the responsibility of training these salesmen be left to the dealer, who through lack of merchandising experience himself or because of the necessity of giving personal attention to other details of his business can not develop the line of salesmanship education that should be instilled into the salesman?

There is no denying the fact that the salesman's method of approach to-day is either so stereotyped or so inaccurate that he is unwittingly discrediting the motor truck industry in the eyes of thousands of business men in different vocations. The best proof of this lies in the exceedingly large number of inquiries which come to the manufacturer, prefaced with the statement, "Do not send your representative's salesman to see us."

It must be remembered that in a very large number of vocations in which motor trucks can be used the prospective buyer is himself an employer of a large number of salesmen, merchandising a product in which competition has existed for years; he has made a keen study of salesmanship. As a result he has adopted methods of salesmanship to insure his share of trade in his particular line. The motor truck salesman of to-day with his indifferent methods of approach and his somewhat lamentable sales arguments helps to convince this type of merchant that there is something "phony" in all arguments of retail motor truck salesmen. He has found from bitter experience in the past that the average motor truck salesman is not equipped to analyze transportation problems—that the salesman's sole thought is to sell the machines which he, the salesman, may be representing at the moment and that his advice as a rule is a misfit. It is not to be compared with the intelligent engineering advice which he would expect and gets from the representatives of any other time- or labor-saving device which he may employ in his business.

THIS condition can not be corrected by individual manufacturers to the credit of the industry as a whole; there must be some concerted action. The solution, in my opinion, lies in the establishment of a "School of Motorized Transportation," where motor truck salesmen could obtain a thirty- or sixty-day intensive course on how to retail motor trucks. The course to cover approach, analysis of conditions, proper routing, proper selection of units for vocations and an accurate mechanical knowledge of their own and competing lines. The course would also give the salesman general information of a constructive benefit to the prospective buyers and operators of motor trucks.

Such a course should naturally be centralized at Detroit. It could be offered to the salesman at a minimum expense. On such a plan the burden of expense might fall on the manufacturer—but it would pay big and immediate dividends to the industry in the immediate increased volume of business its graduates would develop.

It is possible that with every franchise taken on by a distributer a clause could be inserted making it compulsory on the part of the distributer controlling a certain amount of territory to send one or more of his salesmen to this school. The manufacturer might also be sufficiently interested to offer as a prize a certain number of scholarships a year for showings made by a distributer. But the detail could be worked out by a committee who after a thorough investigation should arrive at a plan, call all motor truck manufacturers together and get the plan in such shape that it would be devoid of everything but its helpfulness to the industry.

There is proof that such a plan would be beneficial and motor truck manufacturers encounter it daily. Many sales managers wonder why they lose certain sales. Generally it is attributed to certain big discounts alleged to have been given, but in the majority of cases it was due to poor salesmanship on the part of their own representatives.

Therefore, let us bring the standard of merchandising a product upon which the commerce of the nation will be more vitally dependent in the future than any one other single device to a point where it will stand in favorable comparison with its own importance in the business world.

New Trade Literature

One of the most complete Piston Ring Directories ever published has just been issued by the Burd High Compression Ring Co. It is a book of 112 pages, 4 by 6¾ inches in size, with an attractive cover design in 4 colors, and substantially bound in stiff covers. Over 600 sizes and oversizes of Burd high compression piston rings are listed in the new directory, a size for practically every make and model of gasolene engine. Piston ring specifications for over 1,500 models of automobiles are given. The correct size of piston rings required for nearly every automobile, motor truck, tractor, airplane, hydroplane, motorboat and motorcycle engine can easily be found by referring to the index, which makes this new directory one of the most convenient and practical ever published. In addition to the tabulation of sizes, the Burd directory contains complete instructions for the installation of piston rings, information regarding oversizes, and scores of helpful hints and suggestions about motor troubles, elimination of carbon, United States official millimeters conversion table, decimal equivalents of fractions, etc., that are very valuable to repairmen.

The Climax Molybdenum Company, which is associated with the American Metal Company, Ltd., 61 Broadway, New York, now has on the press its new 72-page book, "Molybdenum Commercial Steels." This volume is the first of its kind. Molybdenum steels have been favorably known to metallurgists and alloy steel manufacturers for some time, but the Climax book makes available for the first time complete and authentic data on the actual commercial production and commercial use of these steels. The text of the book is supplemented by many tables and colored charts, and by photomicrographs and other illustrations. The book treats fully of the physical properties and the heat treatments of the various types of Molybdenum steels developed during the war and since. All the data given have been read and approved before publication by prominent metallurgists and alloy steel manufacturers, whose

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practical experience with Molybdenum steels covers the use of many thousands of tons.

In so far as it is known to POWER WAGON it has remained for the Republic Truck Company, Alma, Michigan, to cover in booklet form a large number of industries in which the motor truck is the predominating mode of transportation. Other manufacturers have at times issued special literature featuring special industries, but never before has an attempt been made to cover the field so thoroughly. This new series of Republic catalogs consists of fifteen in number and is devoted to the following industries: 'Bus lines, coal, contracting, delivery, express and warehouse, farming, foodstuffs, furniture, iron and steel, lumber, manufacturing, municipal uses, oil, refrigerator products and public service. The booklets are richly illustrated and are produced in a style that makes them most attractive.

The particular features of the Autocar Company's new contractor's booklet are set forth on the first page. These features are, in brief: (*1*) The short wheelbase, 97 inches and 120 inches; (*2*) the distribution of the load—45 per centum on front wheels when empty; 30 per centum when loaded; and (*3*) the Autocar system of aftersale service—24 direct factory branches in leading cities throughout the country with dealers in other cities. A list of some 455 users is incorporated in this booklet, but this number does not exhaust the total list of contractor users.

Wins Fight in Council

The passage of the new motor truck license ordinance by the Indianapolis city council is a victory for the transfer and wholesale division of the Chamber of Commerce, says an announcement of that organization. The new ordinance provides for a license fee of $4 per ton capacity. The previous ordinance placed a tax of $11 on a 1-ton truck. Mayor Jewett vetoed an ordinance providing a $3 per ton tax, several months ago.

Strong for Parcels Post

According to Postmaster-General Burleson, the use of more motor trucks on parcels post routes will prove an excellent means of reducing living costs in the cities Mr. Burleson has not only urged congress to provide the necessary equipment for such motor parcels post expansion, but claims that they will in addition show a profit. Nine such routes between Washington and Philadelphia have been established during 1919.

New Company in Virginia

The Chesapeake Mercantile Storage Company is the name of a new corporation formed for the purpose of conducting a hauling and moving business. The company has a number of 3½-ton motor trucks which they will operate in Norfolk, Berkley and Portsmouth, Virginia. The following are the officers of the company: President, M. S. Deusch; secretary, Charles Moses; treasurer and manager, A. N. Jacobs.

Dunlop Tire Returns to Old Field in America

BRIEF HISTORY OF WELL-KNOWN COMPANY

Thirty years ago the first pneumatic tire ever put to practical use—the original Dunlop from which has grown the gigantic tire industry of to-day—was brought to the United States by the late Harvey du Cros, president and founder of the Dunlop company.

The American Dunlop Tire Company, founded by the original company to exploit the pneumatic tire in the United States, manufactured Dunlop tires here for many years, and having had a successful career, was merged in a large consolidation after the parent company had sold its interest in it some twenty odd years ago. The original British company with its subsidiary and allied companies continued to develop the Dunlop tire throughout the rest of the world with such success that Dunlop is to-day the largest tire organization in the world outside the United States.

There are Dunlop tire plants in England, France, Japan, Canada and Australia; Dunlop rubber plantations in the Malay Peninsula and Ceylon comprising 60,000 acres of rubber lands—the largest unit of rubber estates owned by any one concern in Europe; and Dunlop cotton mills in Rochdale, England, with 350,000 spindles, having the largest production in Europe; while the Dunlop sales organization is to be found in every country in the world.

The current market value of the British company's capital is approximately $100,000,000, the common stock standing at a premium of about 90 per cent. A new issue of $5,000,000 common has just been made at a premium of 700 per cent and is being taken up by existing holders.

Capital for the erection of the initial unit of plant for the new American enterprise was provided independently by the issue in England some few months ago of $20,000,000 of common stock convertible into common stock of the American company when formed. Associated with the British Dunlop in this issue were James White of London and W. P. Bonbright & Company, Inc., bankers of New York and London. This stock has since been dealt in in England at a premium of over 100 per cent.

A commission including some of the principal executive members of the board of the English company, accompanied by a staff of experts, arrived here at the end of November, 1919, and has since been actively engaged in making preparations for the creation of the new tire plant.

Dunlop America Limited has been incorporated, and will acquire all the rights of the original American Dunlop Tire Company. About 150 acres of land at Buffalo have been purchased upon which will be erected a tire plant of the most modern kind, embracing all the improvements evolved from the Dunlop company's specialized experience of thirty years of tire manufacture, many of which will be novel in the United States. Cord fabric, which will be exclusively used, will be spun, twisted and woven from the raw cotton in a specially designed cotton plant alongside the rubber plant on the Buffalo site. The Dunlop company believes in specialization and, therefore, with the exception of the Dunlop golf ball, its production will be confined to tires. The pneumatics will be all high-grade cord and the solid motor truck tires will be identical in quality with those Dunlop tires which carried the bulk of the British Army transport during the war.

Dunlop America Limited as an American company will be operated by an American staff. The board will include a strong American element, as well as some of the chief members of the board of the British company, and will have the benefit of a full interchange of patents and technical processes with the British and other Dunlop companies, as well as the services free of cost of an advisory committee constituted from the expert staff of the British organization. The names of the directors and executive officers of Dunlop America, Limited, wil be announced later.

Ship-By-Truck Official Slogan

"Ship-by-Truck," the slogan which H. S. Firestone, president of the Firestone Tire & Rubber Company, of Akron, originated, and which the company has given a national circulation by advertising and general publicity, has been adopted by the National Association of Motor Truck Sales Managers.

The Firestone company's symbol incorporating the slogan—a wheel in motion, with the slogan written across it—has also been adopted by the association. This action of the association, which is the organization that put on the national development tour of motor trucks last summer and which recognized as the official representative of the motor truck industry, was taken at a convention it held recently in Detroit for the purpose of considering ways and means of prompting the increased use of motor trucks.

According to J. E. Tracey, president of the association, the action of the convention means that the association will concentrate the full strength of its influence and prestige behind the ship-by-truck movement.

Trucks Aid Thespis

A theatrical company found itself marooned in Los Angeles, California, with no possible way of filling its bookings. The company's manager refused to be stumped. He secured two Autocars. One was loaded with the special scenery and baggage, and the players climbed into the other, enabling the company to fill all their bookings and carried them, bag and baggage, 895 miles in seven days, and on schedule all the way.

A freight truck line service to all parts of the state will be established by M. Graf, of Logansport. Indiana, about February 1. The rates will be same as those charged by the railroads, he states.

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Legislation and Legal Decisions

Comments on Current Legislation Affecting Sale and Operation of Machines Together with Answers to Questions Will Be Found in This Department Each Month

By A. KALISKY
Attorney-at-Law, New York City.

ONE of the most important developments of the year in motordom has passed almost unheeded. This is the enactment of the Dyer bill. It is now on the federal statute books. The Dyer bill, as it now is, provides that the removal of a stolen motor vehicle from one state to another shall be dealt with by the federal courts, on the ground that such removal is a function of interstate commerce, regulation over which the constitution places in the hands of the United States Government. This is a direct blow at organized automobile stealing, which relies for its success on carefully arranged distribution. The really dangerous gangs of automobile thieves make a practice of getting their plunder away from the district where it originated. Cars stolen in New York may be finally disposed of in St. Louis or even further west. Indeed, the biggest and most successful thief bands have their distribution system so well organized that stolen cars are shipped into whatever market happens to be the most favorable at the moment.

This federal law, with its severe penalties, will go far toward breaking up this method of disposing of stolen cars. No longer will it be possible to send the vehicles into territory where the laws are lax, because one law now covers the entire country. Then, too, federal courts and judges are acknowledged to be far more stringent and less open to influence than local courts and officials. The automobile thief is facing a more hectic period than any he has so far gone through. So much for the direct effect of this new law. But it is in its indirect effect that I believe the new law will prove to be most valuable. This is the first time that interstate traffic in motor cars has been placed on record as a function of interstate commerce. It seems strange that this should be so, when interstate rail shipments and even the movements of migratory birds, have been held by our law makers to come under the head of interstate commerce.

HOW it could be possible to hold that a package shipped across a state line is interstate commerce if it travels in a railway train, and a matter of local police regulation if it goes by motor vehicle, is one of the anomalies in which the legal and law making fraternity delight. However, that is ended now. The movements of motor vehicles have been definitely classed as interstate commerce. Obviously, this opens the way for federal regulation of motor cars, something for which the American Automobile Association and its fellows have been fighting for years. Eventually we shall see all motor vehicles registered under some federal law that will end the ridiculous state laws, which now limit the free circulation of all highway vehicles. The end of "reciprocity agreements" and similar nonsense would seem to be in sight, a consummation for which we may all be thankful.

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Within the last six months, 4,621 automobiles have been stolen in New York State. Automobile stealing has come to be a recognized industry and a far more successful branch of criminal endeavor than is bank robbery. The risk is less. The record of cars stolen in New York is only a duplication of a similar list in every state in the Union. Car thieves have boosted insurance rates. The matter of curbing car thieves has been taken up in many states and in several instances drastic laws have been passed. The federal government has turned its attention to this class of offenders and the Dyer bill now makes the interstate transportation of a stolen car a federal offense.

THE question of how to suppress the automobile thief has been carefully studied by Frank Oliver, Chief Clerk of the City Magistrates' Courts in Ne wYork City. In a review of the present situation he said that, as a matter of fact, the federal government has done nothing to help recapture stolen automobiles. After discussing various legislative remedies Mr. Oliver gave as his opinion that the owner of a stolen car would do better to consult a ouija board then public authority armed with their present "blank cartridge powers."

"The new federal act makes it a felony to transport a stolen automobile from one state to another and the law is excellent," said Mr. Oliver. "It will give the federal courts jurisdiction over the thief. The great trouble, however, is to find the stolen automobile. Unless we can find this we can not find the thief. We may lay our hands upon the thief, but if we can not show that he stole a definite automobile and took it across interstate borders, he must be permitted to go at large. As a matter of fact, Uncle Sam has done nothing to help recapture the stolen automobile. He really has done nothing except to pass a law very difficult under the present conditions to enforce."

Mr. Oliver outlined the four following methods which he believed would stop the car theft evil:

1—The federal government through the medium of a national bureau of information which, acting as a clearing house for state licensing officials, police, and public, would give prompt information about the licensing of cars all over the country, alarms of theft and recaptures. There is no such bureau now. The result is if a man wants to find out if his stolen car has been relicensed he must ask the licensing officials of every state in the Union and Canada. The police are handicapped the same way.

2—The state governments through better laws, inspection of the automobile before issuing a license, a demand for an authenticated bill of sale before relicensing a car, especially a car coming from another state; by demanding a report from garages, second-hand dealers, and repair shops on every car bought and sold or substantially changed; by forbidding the operation of cars with defaced identification marks; by keeping better and more complete records for the benefit of the police and public.

3—The police by a country-wide plan to find the trail of the gangs in charge of the business. The business is run not by disunited individuals, but a fairly close corporation. Every thief seems to know his market and the crooked garage which will dismantle or repaint his car.

4—The public by demanding an abstract of title before purchasing a second-hand car. Title companies are now in existence which, for a nominal fee, will make a title search. Again, the public can help by inspecting the car for defaced motor numbers and by asking the police to report if the car is listed as stolen.

"Above all, is the great educational and information-spreading power of a national bureau of information," added Mr. Oliver. "Not alone will its direct service to the police, public, and licensing officials help in tracking the thieves and recovering the cars, but its indirect influence in aiding the enactment of uniform state legislation, the institution of standard license methods and the adoption by manufacturers of a standard identification of all cars put upon the market will be inestimable.

"This bureau which I have proposed and to establish which a bill is now pending in congress, known as the McKiniry bill, is similar in legal principle to the bill which created the Bureau of Child Welfare.

"THE automobile industry of America is hardly aware of the fact that it is doing hardly anything to prevent its patrons from being robbed and imposed upon by men representing themselves as agents and dealers in second-hand cars and owners of repair shops.

"There is no automobile company which trades in every part of the United States that has not a central office where a record is kept of every car manufactured and sold. On the other hand, each of the forty-eight States in the Union possesses a separate license authority completely out of touch with the neighboring licensing authorities. One is licensing cars which have been reported to the others as stolen. All may be notified of the theft of a car and while the notice is fresh in their offices hardly five out of the forty-eight States have a system by which they can be prevented from granting a license to the very car they have been warned about.

"Then, again, no police force in the country will take upon itself the burden of becoming a clearing house for information for all of the other police forces. The result is that many police departments are unaware that cars which are coming under their observation are on the theft lists of a

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hundred other cities. One police chief and several assistants found out through an insurance company that each of them was riding in a stolen automobile purchased by their superiors from a second-hand dealer.

"So helpless are the police under the present conditions that I noted in a San Francisco paper recently an interview by a police official seriously proposing the erection of block houses on all roads leading out of the city and the arming of sentinels with shotguns with orders to shoot any person refusing to stop on signal and submit to an inspection to see if he be a thief running off with a car. The suggestion, of course, is not worthy of attention except to show how desperate the police situation is."

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The new motor-vehicle regulations of Pennsylvania contain what may be termed drastic regulations against overloading, and it is possible that if some drivers continue to overload their motor trucks as greatly as they are now doing in some instances, similar legislation will be passed by other States.

The regulations provide that no motor truck or trailer shall be operated over any public highway in the State of Pennsylvania if it has a gross weight of vehicle and load combined, in excess of 26,000 pounds, or if there is in excess of 19,500 pounds weight on any axle or if there is in excess of 800 pounds on any one wheel for each nominal inch of width of tire.

It is also provided that no motor truck or trailer shall be operated over the highways of Pennsylvania where the over-all length exceeds 28 feet, with the exception of fire apparatus.

"All commercial vehicles or trailers, the chassis of which weighs more than 2,000 pounds registered under this statute shall have painted on a conspicuous place on the outside and on both sides of said vehicle or trailer, the maximum weight limit of said vehicle or trailer, including chassis, body and load, in figures three inches high."

It is now necessary for all manufacturers selling motor trucks for operation in the State of Pennsylvania to paint upon the machine the maximum allowable load, and any person carrying a load in excess of this maximum carrying capacity as designated by the manufacturer is subject to a fine or imprisonment or both, and may also have his license revoked.

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Automobile thieves in Detroit in future will face a ten years' term in the penitentiary. Decision to prosecute thieves and joy riders under a law which became effective August 14, 1919, was reached following a conference between Inspector L. M. Parker, in charge of the automobile recovery squad, and the prosecuting attorney and his assistants. Under the law joy riders who simply "borrow" a car and thieves are looked upon as equally guilty, the mere taking of any automobile constituting a felony. The maximum penalty is a prison term of ten years. Under the grand larceny law the punishment was limited to five years for persons convicted of thefts and two years for joy riders, with a thirty-day minimum punishment possible.

Truck Dollar Takes Ton 16 Miles Beyond Horse

FREIGHT 23 CENTS A MILE BY TEAM

The experts of the Agricultural Department estimate the cost of transporting a ton of freight a distance of 1 mile by horse and wagon, on the average road in the United States, at 23 cents. In England, where the roads are much better than most of those in this country and where much attention has been given to the development of what the English call a steam lorry and we would call a steam truck, it is said that goods can be carried for 5 cents per ton per mile.

The average rate on all the railroads in the United States during the past few years has been about 7½ mills per ton per mile, but it is possible to pick out a special group of roads upon which the average has been about 5 mills.

On the Erie Canal in recent years the ton-mile rate has been about 3 mills, while on certain canals in Europe (notably the Teltow Canal, near Berlin), which are deeper and wider and on which electric or other mechanical systems of haulage are used, the rate is 2 mills.

The official records kept at the "Soo" show that the average rate on freight carried into and out of Lake Superior in 1913 was two-thirds of a mill per ton mile, while coal is habitually carried from Buffalo to Duluth, and we have the authority of the Pittsburgh Coal Exchange for the statement that it has often been carried from Pittsburgh to New Orleans, for one-third of a mill per ton per mile. Suppose you have a ton of freight to ship and a dollar to spend in shipping it. How far will the dollar carry the ton by these different methods and at these different rates of transportation?

By horse and wagon, a little over 4 miles; by English steam truck, 20 miles; by rail, at the average rate for United States railways, 133 miles; at the rate on the group of selected railways, 200 miles; on the Erie Canal, 333 miles; on the European canals, 500 miles; by lake, at the average rate through the "Soo" Canal in 1913, 1,500 miles; while at the rate at which coal is carried both on the Great Lakes and on the Ohio and Mississippi Rivers, the ton of freight can be shipped 30 miles for a cent, 300 miles for a dime, 3,000 miles for a dollar.

It must already be apparent that the difference in the cost of transportation by different methods is sufficiently great to be worthy of serious consideration, but carry the argument a step further. Taking any point as a center, over how great a territory will a dollar carry a ton by these different methods and at these various rates of transportation?

By horse and wagon, over a circle a little more than 8 miles in diameter; with the English steam truck on the English good road, the diameter of the circle becomes 40 miles; at the average railway rate in the United States, it expands to 266 miles; at the rate on the selected railways, to 400 miles; at the Erie Canal rate, to 666 miles; at the European canal rate, to 1,000 miles; at the "Soo" Canal rate, to 3,000 miles; while at the coal rate which has been named, the dollar will carry the ton to the outer limits of a circle 6,000 miles in diameter.

Changes in Firestone

Announcement of changes affecting a number of its district and branch managers has been made at Akron by the Firestone Tire & Rubber Company. For the most part the changes are in the nature of advances due to expansion of the company's business and promotions higher up. Distribution of $150,000,000 worth of Firestone products is the company's forecast for 1920. Changes affecting district manager personnel are as follows:

Cincinnati—J. P. Patterson, manager of Cincinnati branch, appointed manager of south central district, with headquarters in Cincinnati.

Dallas—J. H. McDonnough, district representative, central district, appointed manager southwestern district, with headquarters in Dallas.

Akron—C. L. Mason, western service manager, appointed manager of the north central district, with headquarters at Akron.

San Francisco—L. R. Jackson, manager of Indianapolis branch, appointed manager of Pacific coast district, with headquarters in San Francisco.

Philadelphia—B. R. Leisure, manager of Baltimore branch, appointed district manager, with headquarters in Philadelphia.

tire sales manager in Cincinnati, vice P. M.

Cleveland, J. M. Bushey, formerly truck

Changes in branch management are as follows:

Pontius, resigned; Washington, E. D. Manley, of the same branch, vice W. M. MacNichol, transferred; Baltimore, W. M. MacNichol, vice B. R. Leisure, promoted; Philadelphia, R. L. Harpham, formerly manager of truck tire sales in eastern division, vice W. R. Walton, transferred to Manufacturers' Sales; Harrisburg, G. C. Bacon, formerly manager of Akron branch, vice J. H. Dutch, transferred to manufacturers' sales; St. Louis, T. J. Barry, formerly district representative, vice F. C. Rudisell, resigned; Denver, G. K. Meeks, formerly manager of Memphis branch; Detroit, G. E. Burkit, formerly manager of Toledo branch, vice R. H. Jeffers, promoted; Toledo, G. F. Guin, formerly trade sales manager of same branch, vice G. E. Burkit, transferred; Indianapolis, C. T. Barnes, formerly trade sales manager of the same branch, vice L. R. Jackson, promoted; Memphis, L. L. Heidacher, formerly district truck tire representative, vice G. K. Meeks, transferred; Cincinnati, J. F. Evans, formerly trade sales manager of the same branch, vice J. P. Patterson, promoted; Duluth depot, J. L. Bain, formerly district representative.

More than 21,883 passenger automobiles and 4,000 motor trucks owned by Kentuckians as against less than 80 per centum of that number last year is seen by automobile dealers as an indication of prosperity throughout the state.

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Motor Truck vs. R. R. Freighting

By W. J. L. BANHAM
General Traffic Manager, Otis Elevator Company

USERS of motor trucks should consider to what extent they can be operated in competition with short-haul freight movement. The principles involved are: First, service; second, cost. There seems to be no question at the present time that the carrying of less than carload shipments to short-haul points by the rail carriers is not only expensive to the shippers, but is also unprofitable to the carriers. Until recently it seemed to be almost necessary for the shippers to use the rail carriers for the movement of their less than carload shipments to nearby points, regardless of expense and delay, as there did not seem to be any organized effort made by the motor truck operators to take care of this class of freight.

It is extremely difficult for the carriers to figure cost of transportation of package freight hauled short distances and particularly to such points on which they do not have a thorough car movement. The expense of transferring the less than carload shipments one or more times when moving within fifty miles of the receiving station, and the additional expense caused by delay of equipment, has been recognized by the government, with the result that the United States Railroad Administration during the war ruled that freight destined within a certain radius would not be handled by the rail carriers. It was necessary, therefore, for the shippers to find other means of transporting this class of freight. Motor truck transportation, while still in its infancy, pointed a way to the shippers whereby their less than carload shipments could be handled not only more promptly, but at a considerable saving both to the shipper and to the receiver of freight alike.

WHILE it is true that it is almost impossible for the carriers to figure the exact cost of handling short-haul freight, it is equally as difficult for the shippers to ascertain the cost of transporting similar freight. The question of cost brings me to the first part of my subject, and in order to make it clear as to what I mean by costs and what these costs cover, I am going to refer to them as "transportation costs." Transportation costs do not necessarily mean less than carload freight rates and motor truck rates, although both rates are a part of the transportation costs.

What I understand to be a true transportation cost is all expense involved in making a shipment, starting with the boxing or packing expense, together with handling expense in the shipping department, the loading of freight on teams for delivery to the freight house, teaming charges from the shipping department to the local freight house, and additional labor incidental thereto. To this must be added the less than carload freight rate and additional charge for cartage at the delivery point, with such other expenses that may be caused by requests for tracing, duplication of shipments, lost or damaged in transit, entering of claims, checking of freight bills, delay to shipments in transit, and the expense of carrying additional stock to take care of freight in transit when moving via rail carriers. All of these costs are properly transportation costs, and are part of the shipping expenses which are paid either by the shipper or receiver.

If you will make an analysis of the charges covering your shipments, it will be of interest for you to know what amount it costs to make less than carload shipments, and if you will compare these costs against the same shipments moving via motor truck, you should be in position to eliminate a number of the cost items, by reason of the fact that it is not necessary to go to the same expense for packing or boxing freight shipments when moving via motor truck, inasmuch as there is usually no transfer in transit.

FOR the information of motor truck users, I have compiled some figures showing the cost of freight movement, compared with the same movement via motor truck. These figures are worked out on an average basis, and while substantially correct, they may not cover local conditions which exist in your shipping department.

In practically every instance, it is necessary to prepare material for freight shipment in an entirely different way than if it moved via motor truck direct from the shipper to the receiver. It is necessary to go to considerable additional expense for boxing or crating, or to protect by other means, in order to prevent loss or damage in transit. This additional packing expense is necessary on account of the number of handlings the less than carload shipments receive at the hands of the teamsters and carriers after the material leaves the shipping department.

We have included in the freight cost the first class rate plus 30 cents per hundred pounds teaming charges at shipping and receiving point. To these costs must be added 17 per centum for the cost of carrying the increased weight caused by heavy boxing and 24 cents per hundred pounds for the increased cost of boxing. The rate via motor truck covers delivery from the shipper's warehouse to the receiver's warehouse, and I have averaged this rate, and believe it to be a fair one to use in comparison with the freight cost-movement.

The rates that I worked out are based on Newark, and we will take, for instance the first item. I understand that in the freight cost item are included the various items that I have referred to such as additional crating, and additional labor, and so on. I find on shipments moving from Newark to Yonkers that if we combined all the costs, that is, additional costs, to make a less than carload shipment, that the rate averages a dollar per hundred. If you take the same movement with a decreased boxing, decreased weight and decreased labor, you will find that the rate averages $.20; so you will see between Newark and Yonkers there is a difference of $.80 per hundred pounds, in favor of the motor truck.

Taking New York, the average rate, combining the same costs, is $.88, as against the motor truck, $.15, Passaic, it is $.88 against $.15, Paterson $.88 against $.18, Trenton, $.88 against $.55; Philadelphia $.98 against $.75—the lower figures are the motor truck rates; Bridgeport, Connecticut, $1.12, as against $.75; New Haven, $1.12, against $.85; in Providence, the combination freight rate is $1.21, against $1.15; Port Jefferson, Long Island, $.98 against the motor rate of $.75; Asbury Park, New Jersey, $.94 against $.45.

I have quite a number of other figures, but those explain themselves, and they average about the same all the way through.

I consider one of the greatest savings made possible by motor truck transportation that of lumber and other material used for packing, together with additional labor and other charges incidental thereto. The amount of this saving, however, will be controlled largely by the material to be boxed or packed, and how much less protection can be used when moving via motor truck as against a less than carload movement via freight.

WHILE some will save more and others less, depending upon product to be shipped and conditions, the great possibilities of saving warrants careful study of the problem.

Have you taken into consideration the amount of material you have in transit which, is not producing any revenue either to the shipper or receiver, while it is in the hands of the carrier?

Have you considered the amount of space you use in your shipping department in order to prepare your shipments to move via freight?

Have you considered how much less space you need in your shipping department if you can materially reduce the amount of boxing and packing used on your shipment?

Have you considered the amount of lumber it is necessary for you to carry for boxing, the space necessary to store it, and the amount of freight charges you pay on wet lumber, if it is stocked in the open, as is usually the case? Boxing lumber will frequently carry from 10 per centum to 26 per centum of its weight in moisture, unless it is passed through a

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dry kiln before being used for boxing purposes.

Could you not use any space which can be saved by changing your shipping methods for manufacturing purposes.

Have you considered the amount of material and money your company has tied up, by reason of the fact that you are unable to state definitely how long it will take to deliver by freight between your factories and your customer?

If a freight movement takes thirty days as against one day via motor truck would it not be to the advantage of your company to use the difference in time, twenty-nine days, for manufacturing?

Have you considered the amount of expense to manufacturers and others for storing and handling their products on account of uncertainty of freight delivery?

Any comparison between rail carrier movement and motor truck movement is entirely in favor of the motor truck, as it is necessary for the motor truck operators to make delivery in the shortest possible time, in order to operate their equipment financially successfully.

It is rather difficult to state definitely as to the range that a motor truck can compete successfully with a rail movement.

What is needed at the present time is organization on the part of the motor truck operators, in order to secure heavier loading and eliminate as far as possible motor trucks returning without a full load.

In general, I am of the opinion that motor truck transportation can, and should compete successfully with the carriers to short-haul points. The delivery time is all in favor of the motor truck, and I am satisfied if the manufacturers will take into account all the various costs and charges which are part of true freight transportation cost, that motor trucks can be operated successfully in competition with the carriers for distances of between 10 and 125 miles.

Want Freight Delivered on Pre-war Basis to Avoid Heavy Express Charge

Local freight schedules of the United States Railroad Administration are declared by the Transportation Committee of the Buffalo Chamber of Commerce to be adding to the high cost of living. Lengthening of the schedules for shipping by freight from New York is declared to necessitate the employment of express service and the extra cost is passed onto the consumer in higher prices. Determined effort is being made by the Chamber of Commerce to restore the schedules to a pre-war basis, but this has been accomplished only as regards shipments of perishables.

Prior to the time the government became the manager of the railroads second morning delivery of freight from New York was made in Buffalo. When the government took over the railroads third morning delivery was instituted. The transportation committee of the Chamber of Commerce promptly registered a protest and accordingly the railroad administration modified its order so that perishables were given second morning delivery, but general merchandise was held over until the third morning. Cleveland, which formerly was able to secure second morning delivery, now gets third and fourth morning delivery on general merchandise, it was stated.

The result is, according to the Chamber traffic bureau, that local merchants have taken to employing express service for much of their transportation, which adds to the cost of the product, the extra cost being saddled right onto the long-suffering consumer.

The Chamber charges that freight cars containing general merchandise now are taken out of trains in Binghamton and allowed to lay there so as not to get into Buffalo until the third morning. It is further charged that where cars arrive in Buffalo on the second morning they are allowed to lay in the yards at East Buffalo, so as to conform to the third-morning delivery system.

According to the National Industrial Traffic League the lengthening of freight schedules has resulted in a shortage of 750,000 cars. This is denied by the railroad administration.

Milk in Giant "Thermos" Bottle on Motor Truck Keeps Cool and Pure

The average citizen accepts modern comforts as a matter of course, and without thought of the machinery which makes them possible. Take the cream for the morning cereal, for instance. He knows only that the product is on his doorstep when wanted. He never contemplates how nor why so long as the schedule is maintained without disturbance. But the collection and distribution of milk for a great city is an intricate problem. Time has a vital bearing on customer satisfaction. An hour's delay invites disaster. Absolute dependability on the part of the machinery of collection and distribution is essential.

Pittsburgh's problem is unusually acute, due to lack of pasturage in the great industrial valleys adjacent to the city, and in the handling of the problem the Reick-McJunkin Company, one of the largest milk and ice cream dealers of the country, has risen to new levels of efficiency.

This company's milk collections extend over a radius of 150 miles, invading the rich Lake Erie country to the north. Local collection of milk and delivery of manufactured product is almost exclusively the province of White motor trucks, thirty-one of which are in the fleet of the Reick-McJunkin Company. This great fleet grew from a nucleus of two Whites installed as an experiment in 1916.

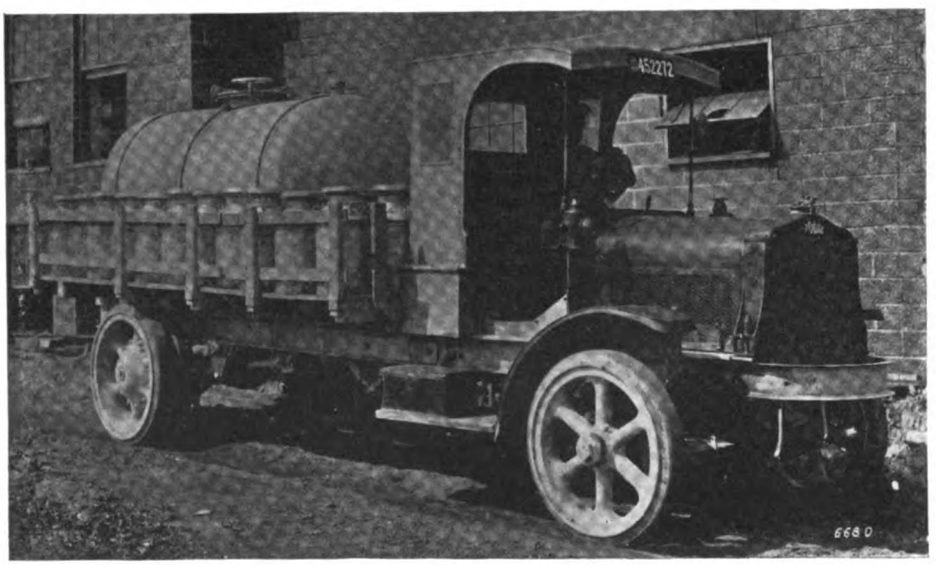
Particularly interesting is the milk conveyor used in the vicinity of Lockwood, Ohio, where a great condenser of the company is located. A specially built glass-lined steel tank of 900-gallons capacity on a 5-ton chassis hauls milk from the collection station at Windsor, ten miles distant, to Lockwood. A rack, built around the tank, permits the carrying of additional milk in cans. Two round trips are made daily, with a third trip in the busy season.

"The glass tank, which is in reality a giant thermos bottle, keeps the milk cool even in the hottest weather—and keeping milk cool is a vital part of our business," says R. C. Bundy, superintendent of the district. "It is cleaner than cans and gives us far greater speed in loading and unloading."

Association Reorganized.

The Joliet Automobile Trades Association of Joliet, Illinois, has been reorganized after a period of inactivity. Fred Bird has been chosen president, J. D. Strutzel, vice president, and Ernest Scagnelli, secretary-treasurer. It has been decided to affiliate with the National Automobile Dealers' Association. The association has also voted to erect signs upon the principal highways of Will county during the year, giving direction and distances to important points, for the guidance of tourists.

The last of Memphis' fire horses have been sold. Fourteen of the animals went under the hammer. And a good many were bought by truck gardeners. The average price ranged slightly above $80.



Giant thermos bottle on motor truck.

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Destructive Legislation

By HARRY G. MOOCH

General Manager, National Automobile Dealers' Association

RECENT developments in Massachusetts, California and Nevada in which opposing transportation interests are seeking to cripple the motor vehicle bring up a new question to the automobile industry. That question is whether the trade as a whole is willing to permit these unjust onslaughts which may in time develop a series of precedents that later will form the framework of much legislation against the motor car itself in the hands of its owner and personal user.

In California and Nevada restrictions are being aimed at the motor truck as a competitor of railroads. In Massachusetts these regulations have become prohibitions against the motor car as a competitor of the street railway systems. In California and Nevada these rules have been thinly disguised as regulations; in Massachusetts they have been openly proclaimed as absolute prohibitions.

In California and Nevada laws have been passed by the legislatures declaring motor trucks common carriers when they are engaged in general hauling and requiring the motor truck operator to show:

Whether the motor truck line is a necessity;

Whether the motor truck line is a public convenience;

Whether the transportation facilities already in use are inadequate;

Whether the motor truck line will be a permanent concern;

Whether it will maintain set schedules of operation.

THESE questions must be proved to the satisfaction of the state public utility commission. In the past these public utility commissions have been concerned, largely, almost wholly in some states, with regulation of the railroads. As a consequence they generally are composed of men who are interested in railroads and more influenced by considerations of the railroads than they are in the development of new conveniences of the public.

In a Nevada case, now in the courts, a railroad, opposing the rights of a motor vehicle company to a permit to operate as a common carrier stated as one of the main causes of its complaint that it:

> Operates a train service that promptly and adequately meets all the requirements of the shipping contiguous to its lines of rail and that neither public convenience or necessity is to be subserved in the continuance or establishment of competitive service.

Another ground for opposing this motor vehicle transportation line was the declaration of the railroad company that "Let the motor trucks run and we will have to quit running the railroad. We pay big taxes that the land holders would have to pay. If the railroad stops running it will mean the ruination of the country."

In a word, the railroad company, unable to longer satisfy the demands for transportation would nullify the natural economic law of the survival of the fittest and, hiding behind commissions and courts, would depend upon them to prohibit the competition that is a natural result of the advent of the motor car and strive to rule the motor vehicle off the road wherever it was found that the motor wagon was performing more efficiently, more thoroughly, more rapidly and at less expense than the same service could be performed by the railroad.

If the power wagon industry owes any duty to the public and I cannot see where a business with such great promise and prosperity can escape owing a duty to the public, it is the duty of safeguarding its operation so that as new ways and means are discovered by the automobile for lessening the cost of living, for providing more rapid transportation, for developing our national efficiency to its greatest height, then those discoveries are of such importance that the industry as a whole can not yield one single iota of advantage to those selfish interests who would keep the American public from its rightful inheritance.

IN Massachusetts the situation has revolved chiefly around the competition between the street railway companies and the passenger carrying vehicles.

Throughout all Massachusetts the street railway companies have united in conducting a campaign against motor 'buses used in public transportation and, a member of our association writes us, have assessed every share of stock 25 cents for "legal expenses," on an investment of upward of twenty millions of dollars.

Trolley companies in the eastern part of the state in some cases have suspended operation until the city governments forbid the operation of passenger carrying 'buses. Several of the city governments have done this. The reason offered by the trolley company is the same as that offered in California and Nevada—loss of revenue which threatens to ruin their business. The fact that poor business management in the past and economic conditions of the present, together with the nation wide popular tendency toward automobiles as a mode of transportation are direct causes of the condition in which the trolley companies now find themselves and because it is economically and physically impossible to maintain a trolley service that can be maintained with ease by a motor 'bus, properly regulated, carries no weight with either municipal or state governments there, our dealer member writes. The state legislature in Massachusetts is even now considering legislation to abolish this motor transportation service.

In this connection it may be pointed out that in some localities the "jitney" is a nuisance, a thing of ridicule and consternation, yet it operates for the same reason as operate the Fifth Avenue 'buses, and the latter is the logical and developed outcome of the former. As the years go by the selling of motor 'buses will form an important part of every dealers' business and this organized attack upon the passenger carrier now, if successful, will deprive the automobile dealer business of millions of dollars of profit and the public of many times that in increased transportation costs

A dealer in Springfield, Mass., writes:

> The vice president of a local street railway company made a statement at a Chamber of Commerce dinner where I was present that it cost his company six and three-quarters cents per passenger per mile to operate. I can prove that a motor bus operated upon a chassis which I handle can be operated for not over a cent and a half per passenger per mile. Depreciation, liability, fire insurance, interest on investment and all other direct and indirect expenses have been taken into consideration.

In Springfield, Massachusetts, this dealer says a special committee has been appointed by the city council from its membership to investigate the motor 'bus situation. Of the five members of this committee, the dealer says, one is a lawyer "who has done a lot of work for the street railway company, one is in the employ of the street railway company and has been president of the trolley men's union, the third is heavily interested financially in that company."

EVIDENCE of the growing popularity of the motor 'bus as a passenger carrier is contained in the report of the Fifth Avenue Coach Company, operating the Fifth Avenue 'buses in New York. According to the statement for the fiscal year ending June 30, 1919, this line had in operation 279 'buses, which carried 36,488,477 passengers over 8,022,026 omnibus miles. The net income of this company for the year was $843,958.52, more than a half million dollars in excess of its income the preceding fiscal year.

Nearly every city of importance in the country, is suffering from a transportation shortage. The street railway companies are unable to provide for the growing needs. They are unable to obtain capital for further development and extension Unable to do this themselves they are throwing every obstacle in the way of those concerns that can. The automobile has superseded the street car just as the street car superseded the horse car and the horse car replaced the carriage. The economic law will inevitably operate to make the motor vehicle victorious over antiquated competitors. But in the meantime the automobile industry must assist nature in every way possible and the best assistance can be rendered by preventing selfish interests to impede by unnatural man made laws, this march to victory.

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Trucks Show Efficiency Beyond Dispute

3-Ton Power Wagon at $18 a Day
Equals 3 Teams at Cost of $39 per Day

BECAUSE of the greater amount of work it will do, a motor truck costing from $12 to $24 a day to operate is actually less expensive than a 2-horse team costing from $8 to $13 a day.

In comparing motor trucks with horses for results in economy, operating costs must be placed in the background. Comparison must be based primarily on the amount of work that can be accomplished in a day by a single unit of both agencies. It is evident that the motor truck, with 3 to 5 times more speed and usually a greater capacity, can do from three to 20 times more work, depending on the capacity of the motor truck.

On account of the varying conditions it is practically impossible to arrive at a definite number of horses that can be replaced by a motor truck. But it is obvious that a 3-ton motor truck, on account of its greater speed, can do at the least possible estimate 3 times as much as a 2-horse team. Stated differently, it would require 3 teams, at a cost of $13 each—a total of $39—to accomplish in a day what can be done with a 3-ton motor truck for $18. Economy begins there and builds itself up by leaps and bounds.

It is a generally accepted fact that a good pair of 1,600 pound horses, working 6 days a week and drawing a 3-ton lumber wagon on hard, smooth, level, dry asphalt pavement, is capable of traveling not more than 25 miles in a 12-hour day at an average speed of 2½ miles an hour in moderate temperature.

Figuring on this basis but allowing for an empty haul one way, a situation which practically rules both wagon and motor truck operation, the work done by a team in a 12-hour day aggregates 37½ ton-miles; in a 10-hour day 30 ton-miles, and in an 8-hour day 22½ ton-miles. The 3-ton wagon travels, loaded, 12½ miles in 12 hours, 10 miles in 10 hours, and 7½ miles in 8 hours, approximately.

A 3-ton motor truck, records have shown repeatedly, can travel, loaded, about 37½ miles in a 12-hour day without any trouble. Thirty miles is considered a fair average for a 10-hour day and 27½ miles for an 8-hour day. The corresponding ton-miles, therefore, would be 87½, 90 and 82½ respectively. Allowance has also been made for a one-way empty haul with the motor truck.

Comparison, then, shows that in this case the 3-ton motor truck does 3 times the work of the team in a day and the cost of operation is only a fraction greater in comparison.

The case of a farmer located a short distance from Detroit, who replaced his team and wagon with a 3,000-pound motor truck, shows graphically the savings in time and money effected by the motor truck as contrasted with truck and horse operating costs.

Horses that are used carefully will not work more than 50 per centum of the working days of the year. It is possible to get 75 per centum of the working days out of a horse, but this is done at the expense of his endurance; he wears out more quickly. On the other hand, a good motor truck is in prime condition 90 per centum of the time, taking out all of the time lost on repairs and adjustments. And in 90 per centum of the year's working days the motor truck could work practically 24 hours a day, if necessary.

Besides advantages, representing profit in various ways, the basic formula of motor truck efficiency—Speed x Load = Work, in which both speed and load exceed that of the horse and wagon, swings the balance far to the side of motor truck economy.

Cleveland Wins Airplane

The Turner Truck Sales Company, distributers of Service motor trucks in Cleveland, is receiving congratulations due to the winning of an airplane in a recent sales contest. The Service Motor Truck Company, of Wabash, Indiana, has for some time been operating a fleet of ten airplanes to deliver emergency repair parts, and during the last six months of 1919 conducted a prize contest, offering an airplane and full course of instruction to that dealer who stood highest on his quota. The Turner Truck Sales Company finished the six months with a standing of 407 per centum on their quota, which gave them first place. As soon as the weather permits, the aviation department will be transferred from winter quarters at Ft. Worth, Texas, to Wabash, and immediately on the opening of the fields some member of the Turner organization will be taught the mysteries of flying, so that the prize can be flown home.

2 Trucks Displace 20 Teams In 3,000,000-Feet Lumber Haul

Some two years ago, A. E. Buck, of East Arlington, Vermont, was casting about for an economical means of getting his lumber from the forest to the railroad. His roads were almost impassable. The cost of hauling by teams was very high. His haul at that time averaged about 12 miles and one trip was all that a team could make a day. Mr. Buck was willing to try anything to get relief, and bought a 2½-ton Mack motor truck. He would have purchased a larger machine if the laws of the state of Vermont had permitted it. By the way, the laws of the state of Vermont prohibit the use of a motor vehicle, the combined weight and carrying capacity of which exceeds 12,500 pounds, and this fact made it impossible for Mr. Buck to use a motor truck larger than 2½ tons capacity. However, the first motor truck installed hauled as much lumber in a day as he could possibly haul with 5 teams of horses.

Shortly after the motor truck had been installed, Mr. Buck received a contract from the United States Government for lumber. It was a hurry up job. He then used this motor truck 24 hours a day, having three shifts of drivers. About this time he purchased a second machine and this was worked on a 24 hour basis—the two motor trucks doing the work of 20 teams of horses. Mr. Buck states that if it had not been for the motor truck he would never have been able to get out his lumber. Last winter, being more or less of an open one, he operated his motor trucks every day. However, an open winter in Vermont means the average winter in New York state—they have plenty of snow.

Mr. Buck moved three million feet of lumber with these two machines over a 10- to 12-mile haul in less than a year's time. One of the motor trucks was in service but six months of that time and for a five month period they worked 24 hours a day.

22 Rural Express Routes Cheapen Farm Produce in Two Large Cities

Twenty-two rural express lines, utilizing the services of 30 motor trucks, supply the demand for direct transportation for the farmers, truck gardeners and dairymen operating in a large part of Maryland.

The motor trucks, which have a combined capacity of 73½ tons, cover 1,574 miles daily, affording a possible daily delivery service of 115,690 ton-miles or 35,000,000 ton-miles a year. They can haul more than 100 tons of farm produce into Baltimore and Washington every day and carry an equal amount of merchandise back to the farmers and country merchants.

Fifteen lines operate out of Baltimore, 5 out of Washington, 1 out of Hagerstown and 1 out of Cumberland. The list of farm produce and industrial products handled by the motor trucks includes vegetables, fruit, corn, wheat, milk, butter, eggs, chickens, live calves, cows and pigs, fertilizer, wood, coal, farm machinery and repair parts, groceries, drugs, clothing, shoes, hardware, house furnishings, pictures, musical instruments, jewelry and newspapers.

Without such direct transportation many of the agriculturists declare they would have to give up raising for market. The vital need is to enable the farmer to give all his own time to farm work and keep his horses at work in the fields. Time spent on the road making a day's journey to market with a load of produce that can be hauled by motor truck in 2 or 3 hours is a definite loss not only to the farmer but also to the food supply of the country.

The motor truck stimulates increased production and cultivation of formerly unproductive sections remote from cities and railroads by providing a quick, dependable means of shipping.

Motor 'buses are being employed for the conveyance of Great Western Railway employes from Newport to Maesglas, England, the train service having been found inconvenient.

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Use Caution in Tire Changes

By J. N. GUNN

President, United States Tire Company

THE present tendency of tire manufacturers to recommend to motor truck operators promiscuous change-overs from solid to pneumatic tires leads me to offer a word of caution. In my opinion the time has come when intelligent advice should be given to the motor truck owners of the country on this subject. There is reason to doubt whether motor truck owners in changing over indiscriminately from solids to pneumatics understand that such a change-over is not always satisfactory and may even be harmful to their motor trucks. The truth of the matter is that there are certain circumstances under which it is wise for a motor truck owner to use pneumatic tires and other conditions under which it is equally wise to continue to use solids.

The chief purpose in making this statement at this time is to prevent dissatisfaction to motor truck owners who, attracted by the success of the big pneumatics, may be contemplating discontinuing the use of solid tires and using pneumatic in their stead without inquiring into the suitability of the pneumatics for their motor trucks or their particular needs. It would be well for an owner to consult with a tire expert before making such a change.

A fact realized by few is that motor vehicles are built as a rule to meet the conditions imposed by the tires they are to carry. Most people regard tires as an accessory which have little influence on the structural design of the vehicle, but automotive engineers know that it is the tires which determine the general characteristics of the vehicle they are to carry. The development of the pneumatic tire was the chief factor in making possible the passenger car of to-day.

All except a few of the motor trucks in operation to-day were built from engine to rear axle along lines which would make them adaptable for use on solid tires. In designing these motor trucks, the sole object of the engineers was to secure the highest efficiency of operation possible under the limitations imposed by the natural characteristics of solid tires.

A small number of firms build motor trucks especially for pneumatics, but the number of makes of this sort is very limited. The number will undoubtedly grow rapidly, for the advantages of having a machine ride on air are so apparent that the demand for power wagons designed for pneumatics can not help but become great in the immediate future. A motor truck designed for pneumatics differs radically from one built for solid tires. Motor truck and tire engineers are now working together to solve the problem of faster highway transportation and the solution is found in a motor truck specially designed to operate on pneumatic tires, having a chassis corresponding to that of a passenger car, an engine which will drive the vehicle at high speeds and still show the necessary economy in gasolene and oil, a rear axle and differential gears which will compensate for the larger outside diameter of the tires, and a braking system that is powerful enough to give the driver complete control of the heaviest machine under all conditions.

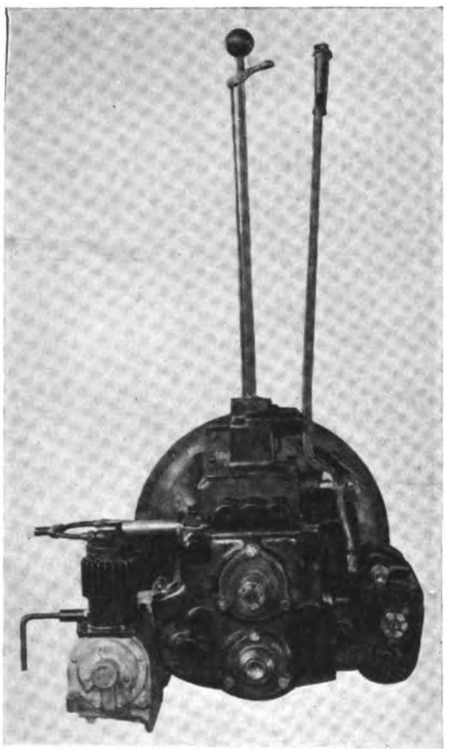
It is because most motor trucks are designed for operation on solids that motor truck users may find pneumatics unsuited to their requirements. If a motor truck designed for solids is changed over to pneumatic tires, the increased cost of this equipment can be most easily offset by increasing the radius of action; that is, increasing the speed. While the tires are designed for this, the engine, transmission, differential gears and brakes are not. Another limiting factor that should be clearly borne in mind is that pneumatic motor truck tires have been satisfactorily perfected only in sizes up to 8 and 9 inches. Larger tires than this are still in the experimental stage.

There are some conditions under which it is wise to change over from solids to pneumatics, even though the motor truck construction contemplates the use of solids. There may be certain disadvantages as a consequence of the change, but these will be more than offset by certain advantages to be gained through use of the pneumatics.

Because of the multiplicity of uses to which motor trucks are put, it is almost impossible to lay down any hard and fast general rule showing the conditions under which pneumatic tires should be used, or under which solid tires would be proper equipment.

Pneumatic tires have certain very definite advantages over solids. It is just as desirable to have all motor trucks operate on pneumatic tires as it is to have all passenger cars operate on pneumatics. The invention of the pneumatic tire was one of the greatest steps forward in the development of the passenger car, and the pneumatic tire for motor trucks is as great a step forward in the evolution of motor trucks. There is no doubt that ultimately pneumatics will be the standard equipment for practically all vehicles of this character.

Until motor trucks are designed especially for them, motor truck owners should hesitate about substituting pneumatics for solids unless they are sure that pneumatics are better suited to their machines and their needs than solids.



New model power take-off.

Fuller Power Take-off

The Fuller & Sons Manufacturing Company, Kalamazoo, Michigan, have brought out a Model 1-A power take-off which may be attached to the larger models of Fuller transmissions on the right or left side, on smaller models it may be attached on the right side, and other transmissions having S. A. E. standard openings for power take-off. The large gear of the power take-off meshes with the large gear on the countershaft of the transmission. The large power take-off gear turns on two large annular ball bearings. The mainshaft is a 1⅛ standard S. A. E. taper and can be extended either forward or rear. The shifting yoke can be extended either forward or rear. The power take-off is a practical and efficient means of utilizing engine power for operating winches, hoists, dump bodies and various other mechanical devices.

Hoosier Show March 8

March 8 to 13 has been selected as the dates for the twentieth semi-annual show of the Indianapolis Automobile Trades Association. The show will be held in the Manufacturers' Building at the State Fair Grounds. The new heating system will have been installed by that time, it is said. Motor trucks as usual will compete with pleasure cars for the attention of the thousands of visitors to the show.

Scranton, Pennsylvania, is the latest addition to the list of cities that are solving their transportation problems by use of the motor 'bus. Five Packard 'buses are to be placed in operation soon. The 'bus line will be operated on a five-cent fare basis.

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The hub cast integral wheel is not a success. The machined surfaces of the hub become distorted and bearings are injured through casting strain, tire pressure and road pounding.

Hub cast integral wheels are at most times very difficult to remove and put back in proper bearing adjustment. Never buy trucks so equipped. You will have lots of trouble.

SMITH WHEELS assure complete satisfaction at all times. SMITH WHEELS are hubless. Their design has always been the same. Others change with each new moon, and each time they are always "the best."

The public does not experiment with SMITH WHEELS. They are guaranteed *forever*.

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Dean Law Arouses Hoosier Ire

Bill Harmful to Motor Truck Transportation Said to Have Been Irregularly Passed by Legislature; May Cause Formation of Owners' Association

FOLLOWING the arrest of one of its members, caused to effect a test case, a meeting of motor truck owners was held at Indianapolis on January 24 under the auspices of the Indiana Transfer and Warehousemen's Association to map out details of the fight on the Dean motor truck law and gather sinews of war. A dozen industries were represented at the meeting and all indicated that they would gladly provide funds for the war on the Dean law, which, it is asserted, will prove a body blow at the motor truck industry, if not defeated.

The Dean bill, according to the Transfer and Warehousemen's Association, which took the initiative in the fight, was passed at an early morning session of the legislature, without proper reading, and under a title which, contrary to the charter of the State of Indiana, did not indicate the nature of the measure.

Ostensibly, the Dean law was a registration measure, but it changed the old state taxation from $5 per motor truck to a sliding scale and absolutely prohibits on the state highways any machine of more than 10 tons capacity.

"Motor trucks operated only on city streets and taxed for the use of city streets must pay a double tax under the Dean law," says the legislative committee of the association. If the Dean law is a registration fee, why should the state collect more for registering a 5-ton motor truck than for a 1-toner?"

The old fee for registering a motor truck of any size was $5. Here is the schedule under the Dean law: One-fourth to ¾-tons capacity, $6 plus $3 additional for every trailer. Three-fourths to 1-ton, $8 plus $4 for each trailer; 1-ton and less than 2-tons, $10 plus $5 for each trailer; 2-ton and less than 3½-tons, $20 and $10 for each trailer; 3½- and less than 5-tons, $30 and $15 for each trailer; 5-tons and less than 7½-tons, $40 and $20 for each trailer; 7½-tons and over, $50 and $25 for each trailer. Motor trucks of more than 10-tons are not permitted on the state highways. Owners are being urged, under the plan mapped out, not to buy state licenses under the Dean law, but to submit a certified check for $5, the old tax, and put signs on their motor trucks indicating "license applied for."

The case against the association member who was arrested in order to bring the situation to the court's attention, came up January 23, but the prosecutor refused to prosecute, and the case was continued. Two reasons are assigned by the Indiana Transfer & Warehousemen's Association for the stand of the attorney: Either he knew nothing of the points involved, and wanted time in which to study them, or he knew that the arrest was pre-arranged, as it was. However, the case will be heard again, and either the association or the state will appeal. The former, in any event, will seek an injunction to enjoin the state from collecting the tax pending a final decision.

A feature of the Dean law is the trailer provisions, which call for a tax on trailers varying according to the size of the motor truck to which it is attached. Tom Wyder, secretary of the Transfer and Warehousemen's Association, points out that trailers are usually operated in connection with fleets of motor trucks, being shifted to wherever needed, and not being used consistently on the same type of motor truck. Under the Dean law, therefore, either the state would charge too much or the operator would pay too little tax.

A possible outcome of the Indianapolis meeting is the formation of a Truck Owners' Association. The exchange of experiences between owners in various industries was so interesting that sentiment was immediately created favorable to the formation of such an organization. Among the industries represented, by organization secretaries in most instances, were coal, paper, ice cream, building material, wholesale grocers, commission, packers and others.

An interesting feature of the meeting was the exchange of experiences which preceded it. Most of the discussion was on the merits of pneumatic tires as compared to solid. One owner scored a hit when he said: "I favor pneumatics on motor trucks up to 2-tons, and on some of them in certain industries. For most 2-ton motor trucks and all over that size, I favor solid tires, with the cushion wheel." Sentiment was by no means unanimous, even on this point, however Great stories of performance of motor trucks with pneumatic tires were related, only to be offset by others telling of how they fell down, causing loss of time and money. One owner told of how the use of pneumatic tires had saved him money in the form of engine trouble, and another who favors solid tires, told practically the same story.

Modern Loading and Unloading Methods Speed Lumber Haulage

Better delivery time is made and less labor employed by the William C. Schreiber Lumber Company, of Chicago, through the use on its Packard motor trucks of the McGarry Lumber Loading Device.

Lumber firms using this device usually have two transfer wagons for each machine, so that a wagon will always be loaded and ready when the motor truck returns to the yard. One man at the wagon crank and one man at the auto crank can easily revolve the rollers which transfer the load from the wagon to the motor truck. The actual transfer, it is stated, consumes no more than one to two minutes.

Unloading, the motor truck driver alone can operate the device. First, he rolls the load partly off, draws a chain around one end and then rolls the load off until the rear end strikes the ground. He then starts his motor truck and the whole load falls to the ground in a compact mass. It does not scatter or spread.

Short lumber can be transferred, dressed lumber, flooring and siding can be dumped without being marred. By placing 3-inch planks on the transfer wagon under the load, lath and shingles can be transferred. Wagon or motor truck bodies can be handled in the same manner.

One and one-half to two and one-half hours' time is saved both at the start and destination of a motor truck loaded with four to five thousand feet of lumber.

New Republic Body Catalog Is More Complete Than Former Issues

The Republic Motor Truck Company, Inc., Alma, Michigan, has just issued its latest catalog on truck bodies. The book shows a varied line of standard body equipment and deals fully with the proper method of mounting bodies on Republic chassis. Each body illustration is accompanied by complete specifications as to size, construction and utility. The various types of cabs are also fully described. Blue prints give complete information as to the exact dimensions followed in building each type of body, and the catalog is about as complete as one could wish. The Republic body catalog deals only with the Republic's standard body types. Special bodies, such as dumpers, lumber jobs, fire and sprinkler apparatus, tank bodies, etc., are fully covered in another publication.

A point usually overlooked in connection with body building is the advertising value which a properly designed, attractively built and well mounted motor truck body offers to the owner. This topic is discussed in the catalog's preface and throws light upon a trucking angle which is so frequently neglected.

With the increased facilities recently installed at the body building plant of the Republic Motor Truck Company, its production has been vastly increased. The Republic body business, while always heavy in the past, has grown to such proportions within the last year that it was necessary to move the body department to a separate building where ample space and facilities were available to keep pace with its steady expansion.

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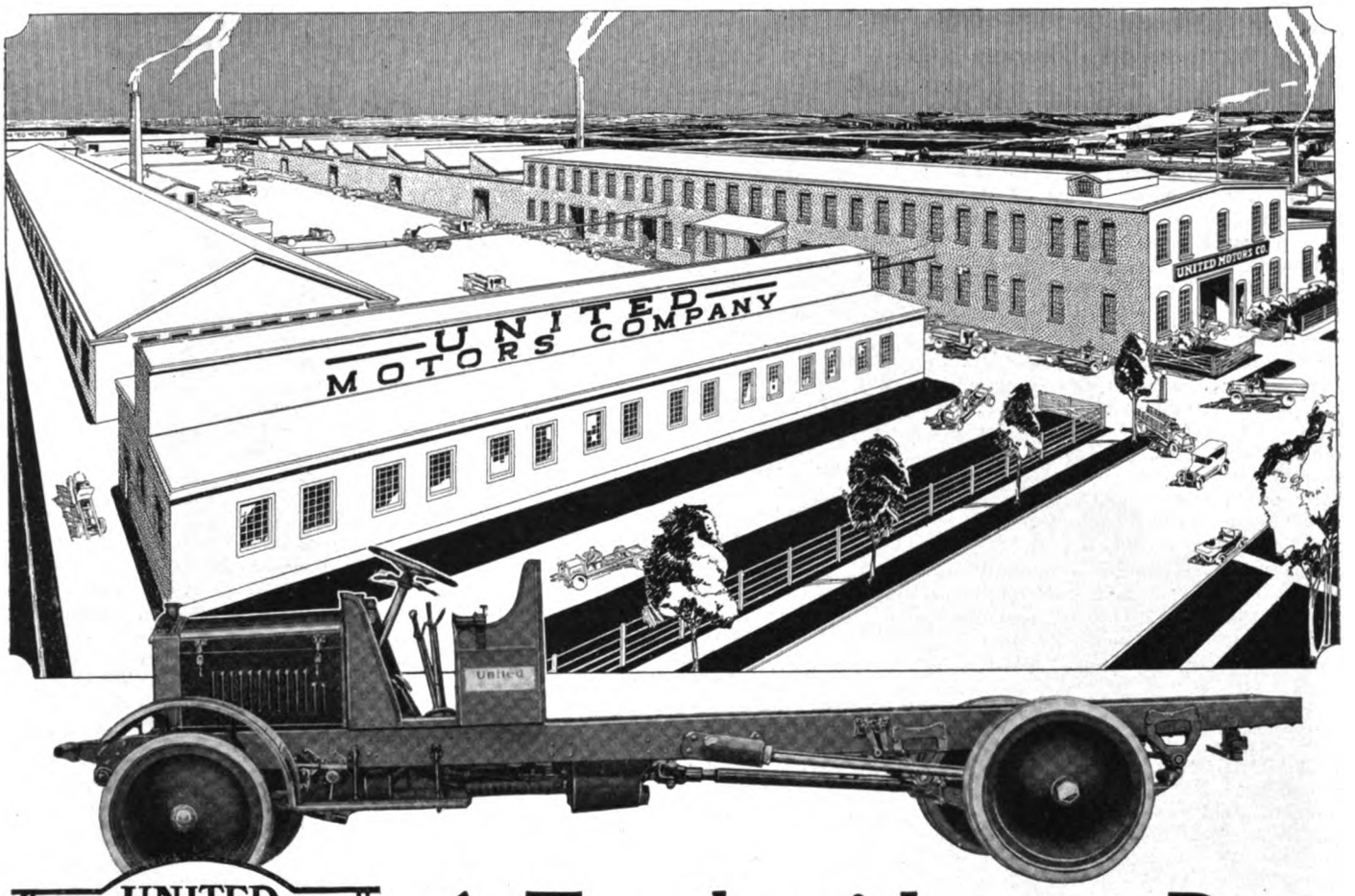

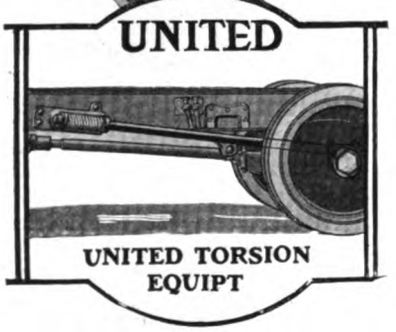

A Truck without a Peer

built by an old established, well financed company able to make prompt, satisfactory deliveries.

Few trucks compare with the United in power and performance. The quality of this truck is apparent and easily demonstrated. Its many exclusive features reflect careful, experienced construction.

You will find the unquestioned value of United motor trucks will swing the solid substantial truck buyer. With a size for every type of haulage, 1½, 2½, 3½, 5 ton models, the United dealer is able to easily meet today's requirements.

In all matters of service we are known as standing solidly behind the local dealer and help him retain his customers' good will by prompt and able assistance.

UNITED TORSION ROD

The torsion rod regulates the shock and weight on the springs and axle and is typical of the thought and care which has made this the wonder of truckdom.

The engine in this truck is the Buda. Stromberg carburetor, Brown-Lipe transmission, Clark internal gear axle Eisemann magneto, Simplex governor and Ross Steering Gear.

A GOLDEN OPPORTUNITY FOR LIVE DEALERS

The United still has an opening for a few responsible dealers who have the financial backing, the pep and the experience to properly represent this company. To this type of man a selling franchise is available which will prove a most profitable connection.

UNITED MOTORS COMPANY
GRAND RAPIDS, MICHIGAN

UNITED TRUCKS

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H. C. of L. Races to Markets Over Roads Where Produce Lies and Rots

Serving lettuce salad on your table every day, or when you want it, may depend on what your community is doing for the improvement of its roads. Lettuce salad is not a highly essential victual. Many persons could go through life without tasting it. Yet an Eastern publication uses this delectable addition to the average American's table, striking him "where he lives," so to speak, in a worthy boost for good roads, much as follows:

"The road that makes certain you can have lettuce salad every day in the year also makes certain that you can get fresh eggs, milk, poultry, butter, potatoes and other things when you want them—and that should interest you. Think of the farm produce you could buy or sell that now goes to waste because the roads prevent hauling to the market."

The United States Food Administration estimated that bad roads in Erie County, Pennsylvania, added at least $2,000,000 to the food bill of Erie and other cities in the county during the winter of 1918.

Truck Saves $15 a Day

By installing a power winch on a 4-ton Packard motor truck the James Sugden Company, Inc., cable contractors of Boston, Mass., has not only increased its capacity for installing underground cable but has also done away with the services of five men and effected a saving of $15 a day.

With a crew of 13 men, the company, when installing a 3-conductor cable with a hand winch, averaged around 2,200 feet per day against 3,200 feet now being installed with the power winch, thus gaining 1,000 feet more of cable a day. Installation of cable per minute is now at the rate of 40 feet as compared with 20 feet per minute the old way, just doubling the capacity.

In addition to reducing the size of the crew, cutting down expenses and increasing the company's capacity for laying cable, the power winch has made easier work for the reduced crew. Practically all the men have to do is turn the reel.

Springfield Show March 2

The Springfield, Illinois, Automobile Dealers' Association has decided to give a show of motor vehicles at the spacious State Arsenal. The dates were fixed at March 2, 3, 4, 5 and 6. Thirty motor vehicle dealers have applied for space, advance notice of the number being required from each. About 100 machines will be on display. Motor trucks and tractors will be displayed as an annex.

Fisher With Buda

The Buda Company announces the appointment of R. B. Fisher as general sales manager, who will direct all domestic and foreign sales and advertising departments. John P. Mahoney will continue as sales manager of the engine division, and S. Gordon Hyde as advertising manager. These and other sales departments will be under the direction of Mr. Fisher.

Powers in Rubber World Seek Hall of Fame

Leaders in the Industry to Make Effort to Win High Honor for Charles Goodyear

AN effort to secure a place in the Hall of Fame for Charles Goodyear, the inventor of the process of vulcanization on which rests the whole rubber industry to-day, will be made this year by leading figures in the rubber world. Elections to the New York University Hall of Fame take place every five years, and 1920 is one of the years for making selections. Col. S. P. Colt, chairman of the board of directors of the United States Rubber Company, has already inaugurated a movement to bring the claims of Charles Goodyear to the attention of the one hundred electors who will vote on candidates, and as a first step has written a letter of formal nomination to Robert Underwood Johnson, director of the Hall of Fame.

The claims of Charles Goodyear have been brought to the attention of electors at past elections in an unostentatious way, but rubber had not attained, even so late as the last election in 1915, the place of importance in American business it holds today. In 1914 the total production of rubber goods in the United States amounted to only $320,000,000. In 1918 the output was nearly four times as great, $1,122,000,000.

Goodyear's discovery of the vulcanization process is one of the romances of the history of invention. One of the reasons why he is especially entitled to recognition is that he understood clearly the importance of the results he was seeking to attain, and though he finally by a mere accident discovered the solution of his problem, it was not accidental that it was he who found the solution for he had devoted his entire energy to the subject for years.

With a prescience that was uncanny he forecast for rubber a future that even the development of the rubber industry in the past few years has not surpassed. He knew little about the electrical field, it is true, and nothing whatever about automobiles, yet his claims for patents made in the early forties show a vision for the future of rubber that was startlingly clear.

A man of strong religious tendencies, he felt himself under a divine impulse to carry to success experiments which would confer so great a boon on humanity. It was this feeling that led him, in spite of most precarious health and deep poverty, to continue for ten years his search for the elusive secret of how rubber might be made suitable for use.

As his experiments progressed he not only manufactured rubber goods, but even dressed in clothes made of rubber, wearing them for the purpose of testing their durability. He was certainly an odd figure and his appearance led one of his friends, who was asked how Mr. Goodyear might be recognized, to reply: "If you see a man with an India rubber coat on, India rubber shoes, an India rubber cap, and in his pocket an India rubber purse with not a cent in it, that is Goodyear."

His poverty was so extreme that many times only the kindness of friends and neighbors kept his large family from starvation. At that period imprisonment for debt was in vogue and on many occasions Goodyear found himself locked up for debt. He was regarded as a "crazy inventor," and, as time after time his hope that he had finally hit upon a solution of his problem proved illusory, his friends and relatives did not hesitate to tell him with much harshness that he should give up his experiments and find some means of supporting his family. But he persisted until he won complete success and then, instead of settling back and reaping a harvest from his discoveries, continued to spend the money that came to him, in adapting his discoveries to practical uses.

Though born in New Haven, Connecticut, Goodyear spent much time in New York City and in various towns in Massachusetts. It was in Woburn in the latter state when some rubber fell accidentally from his hand upon the top of a red hot stove that he learned that the application of heat was the one additional element needed in the solution of the problem. So intimate was his acquaintance with his subject that the change produced in the rubber by its unexpected contact with the stove was recognized by him as of vital importance.

Large sums of money had been invested and lost in rubber manufacture before Goodyear brought his process to completion. Goods that looked all right were made up, but cold weather made them stiff and brittle, and in summer they became soft, and decomposition in hot weather gave them an offensive odor.

Goodyear was born December 27, 1800. In 1834 he began his rubber experiments but it was not until the spring of 1839 that the stove incident occurred. His process was not fully perfected until 1844. He received the grand medal of the world's exhibition at Paris, the great council medal of the exhibition of all nations at London, and the ribbon of the Legion of Honor from Napoleon III. He died at the old Fifth Avenue Hotel in New York in July, 1860. Death found him insolvent and his family heavily in debt. Though he made no fortune for himself, great wealth has come to many through his invention.

Bohan Joins Torbensen

Lloyd J. Bohan, who for the past three years has been connected with the Gurney Ball Bearing Company, of Chicago, has joined the Torbensen Axle Company to act as sales representative in Chicago and territory west.

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Basic Strength

Paige Motor Trucks have the basic strength to perform the unusual task as well as the usual. No work can impose a burden too heavy for Paige strength, a task too brutal for Paige endurance-qualities.

Into every Paige truck is built the stamina to keep it on the job uninterruptedly, day after day and year after year. By its faithful performance and sturdy dependability, it is continually justifying its right to be called "The Most Serviceable Truck in America."

Paige reputation grows with each successive truck that bears the Paige nameplate. The reliable character of Paige service has won for it the spoken approval of Paige owners everywhere.

Ever since the Paige nameplate first appeared ten years ago, it has been relied upon as the symbol of an institution rather than as the mark of a product. We take pride in the fact that this faith reposed in us as an institution has never been violated.

PAIGE-DETROIT MOTOR CAR COMPANY, DETROIT, *Michigan*

Manufacturers of Paige Motor Cars and Trucks

PAIGE

The Most Serviceable Truck in America

MOTOR TRUCKS

Please mention "Power Wagon" when writing to advertisers.

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Illinois Dealer Puts On $50,000 Show

Exhibition Draws 10,000 Farmers from 35 Counties in Central Part of State

DAYTON KEITH, of Bloomington, Illinois, believes that power farming must be sold first and that the sale of tractors will follow. He conceived the idea of an exhibit of power farming equipment which can be operated in conjunction with the tractors of which he is the distributer in the ceneral Illinois territory, comprising 35 of the richest counties of the corn belt. He engaged the capacious Coliseum, one of the largest structures of the kind in the state and, during the four days of Jan. 21, 22, 23 and 24, he placed on display $50,000 worth of implements. He secured the co-operation of the following concerns: Acme White Lead Color Works, Chicago, Illinois; Roderick-Lean Manufacturing Co., Mansfield, Ohio; Port Huron Threshing and Shelling Machine Company, Oliver Chilled Plow Works, South Bend, Indiana; Baker Road Making Machine Company, Springfield, Illinois; Owensboro, Kentucky, Ditcher and Grader Company; Ann Arbor, Michigan, Silo Filler & Hay Baler Company; Nelson Binder Accessory Company, Galva, Illinois; Otwell Tractor & Mowing Equipment Company, Detroit, Michigan; Rockwood Pulley Manufacturing Company, Indianapolis, Indiana; U. S. Rubber & Belt Company, Chicago, Illinois; Stover Feed Mill Manufacturing Company & Engine Works, Freeport, Illinois; Herring Motor and Oil Company, Des Moines, Iowa; Rude Manure Spreader Manufacturing Company, Liberty, Indiana, and the American Seeding Machine Company, Springfield, Ohio.

Each concern sent a large exhibit and a number of representatives, while the Oliver company, in addition, sent their famous collection of implements used by the early settlers of the United States, one rare relic being the plow handled by Daniel Webster, the statesman, when a young man.

In connection with the exhibits, Mr. Keith gave a moving picture show twice a day which included views of the national tractor show at Wichita, Kansas, and also one entitled: "Keeping the Boy Upon the Farm," showing the difference of operating a farm before and after it had been tractorized. In addition, there were talks upon soils, the preparation of the seed bed and power farming by well known authorities upon the subjects, including A. E. Hildebrand, manager of all of the national tractor shows for the past ten years; and C. A. Bacon and C. F. Rogers, both of the Oliver Plow Company.

A successful drawing card was the distribution free of $1,500 worth of implements. Each day of the show two machines were given away. Every farmer who attended was asked to register his name and address. He was then given a coupon ticket containing a number which gave him a chance in the drawing. On the final day, as a side attraction, a road making machine was given away, only highway commissioners being eligible to compete, the machine to become the property of the township in which the holder of the winning ticket held office. The registry system gave Mr. Keith the names and addresses of many thousand tractor prospects and this list in itself was regarded as being worth the cost of the show.

During the four days of the exhibit, it was computed that 10,000 farmers attended, some coming a distance of forty to fifty miles. Weather and road conditions were ideal and this promoted the attendance. The 200 sub-dealers of the Dayton Keith territory were his guests during two days of the show. Luncheon was served to them at the Illinois hotel and there were talks by C. M. Brownell, general advertising manager of the Henry Ford Company, and others.

Following up the show at Bloomington, Mr. Keith arranged for a similar exhibit, although upon a somewhat less elaborate scale, in each county of his territory during February, March and April. The exhibits were moved from county to county and a program similar to that given in Bloomington was arranged. As the other counties were not able to provide such a large building as the Coliseum, the array of exhibits was curtailed to meet local conditions in each county seat. By continuing the show to all counties it was believed that the great majority of the farmers in the territory would be reached and the advantage of power farming brought home to them.

Trucks Will Ease Burden of Higher Rates

Increased Cost to Each Family Estimated at $187 to $250 When Railways Get Expected Boost in Rates

"THE threatened advance in freight rates on March 1 and the advance in costs of living which naturally will follow, will result in an insistent demand for more motor truck express lines." This was the prophecy made to-day by E. A. Williams, Jr., president of The Garford Motor Truck Company, who, with other Garford officials, is attending the automobile show.

"It is generally understood in administrative circles that, when the railroads are returned to private ownership on the first of March, there will be a marked increase in freight rates. According to one writer the increase will aggregate between $750,000,000 and $1,000,000,000. It is estimated that this will increase the cost of living for every American family any way from $187 to $250.

"Obviously the motor truck holds the only practical solution to this transportation problem which rapidly is becoming more acute, so far as it effects living costs. The truck has thoroughly demonstrated its capabilities. It has proved its ability to make the shorter hauls at a lower cost and with greater speed than the railroads. In the many communities where motor express lines have been established, actual comparison gives the motor truck an advantage in many cases most marked.

"Figures recently compiled in New York clearly indicate this advantage. Based upon rates per hundred pounds these figures show that the cost of transportation by motor truck from New York to Yonkers was but 20 cents while by rail it was $1.04. Motor truck transportation between New York and Philadelphia was 80 cents; by rail the cost was $1.02. The rate by motor truck between Bridgeport, Connecticut, and New York, was 70 cents; by rail, $1.10. Motor truck hauls between New York and Providence, Rhode Island, averaged $1.10 per hundred pounds; by rail the cost was $1.32. From New York to Paterson, New Jersey, and Passaic, New Jersey, motor truck costs were 20 cents per hundred. The rail charges were 91 cents.

"In each instance the cost of shipping by rail was figured on the first class rate. To this was added 15 cents per hundred pounds for teaming charges from the shippers' warehouse to the freight depots, the same amount for teaming charges between the freight depot at the point of destination and the receiver's warehouse, plus 24 cents per hundred for increased cost in boxing shipments to withstand rough usage and, the resultant increase in weight due to heavier boxing. Many other items such as extra bookkeeping, billing, possible loss of time, etc., were not added to the cost of shipping by rail.

"There are numerous reasons why motor trucks are able to reduce transportation costs, particularly over the shorter routes. There is the matter of handling the freight—quite an important item. Mofor trucks provide a direct route from shipper to receiver, eliminating delays at freight terminals and doing away with extra hauling. This saves time, expense and labor. Then there is less possibility of damage, and in the case of live stock, less shrinkage.

"The rural motor express also is capable of playing an important part in reducing food costs. These lines give the farmer and gardener a daily outlet for their perishable produce without the dangers of wastage. They increase the area within which foodstuffs can be marketed profitably. They serve to increase production of foodstuffs by making such production more profitable to the farmer. At the same time, they 'cut' the cost to the consumer because they eliminate the middleman."

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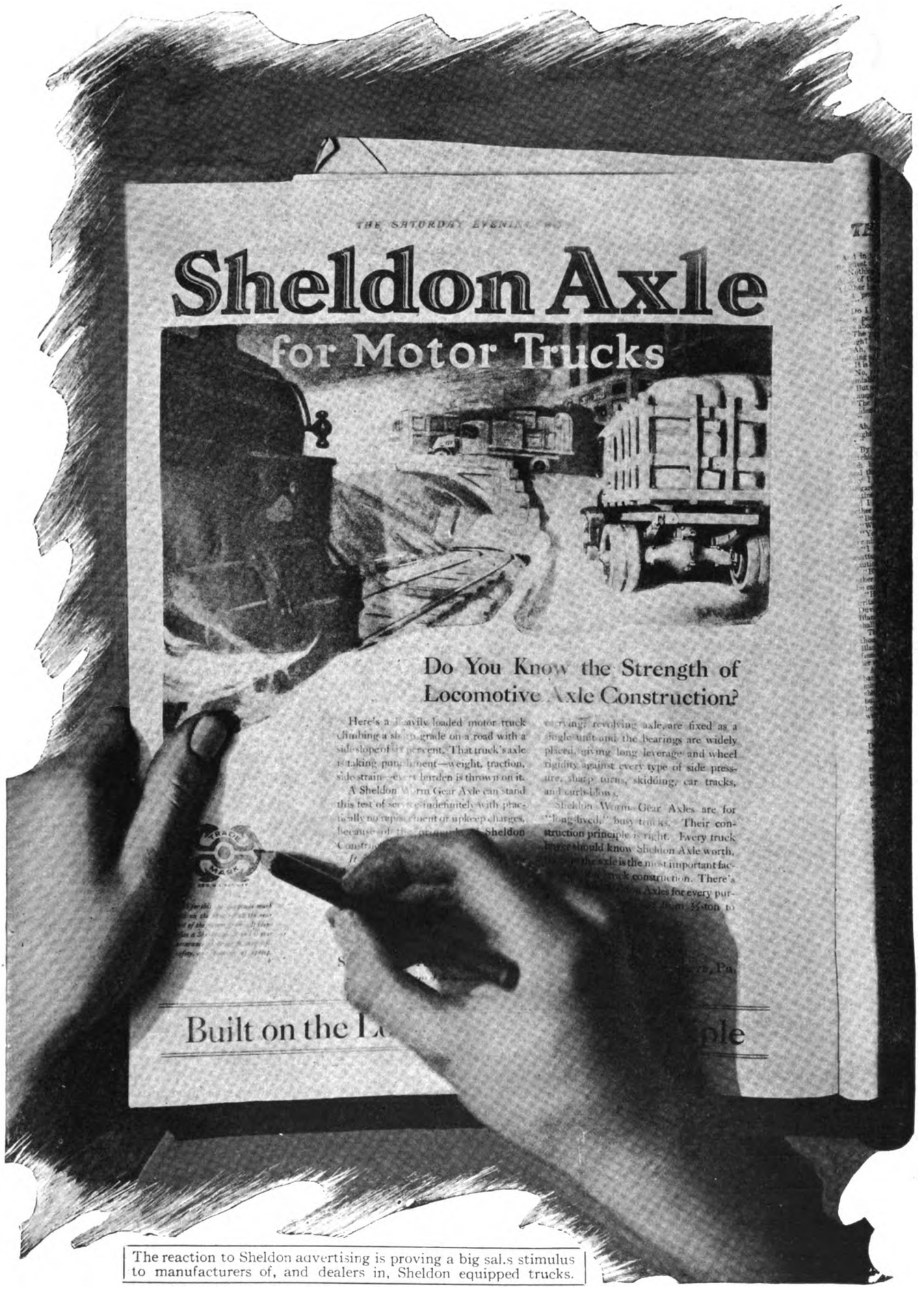

The reaction to Sheldon advertising is proving a big sales stimulus to manufacturers of, and dealers in, Sheldon equipped trucks.

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Champions Transport and Roads

English Official Would Place His Nation in Foremost Ranks with Respect to Transportation Over Highways

WILLIAM JOYNSON - HICKS, chairman of the newly appointed motor legislation committee of Parliament, sees perhaps more keenly than any other public man the great importance and demand for the development of motor-transport and automobile roads. He has been fighting for this for years. He believes the lessons of the motor truck in the war have proved that it can be utilized tremendously for the upbuilding of commerce and country.

As chairman of the Automobile Association he has long recognized the necessity for good roads; as chairman of the Belgian field ambulance service, raising two battalions, he saw the great value of the motor as a time saver and direct method of freight transportation.

Mr. Joynson-Hicks advocates these important things for England—many of which, it is pointed out, could be of unlimited value in America, if adopted there:

1. Centralization of power and authority, over the highways in the road board, which was organized years ago but just now is in a state of suspended animation.

2. Construction of good roads into the undeveloped sections of the country—away from the railroads, for the better development of suburban sections.

3. Construction and reconstruction of roads for purely commercial reasons, leaving the pleasure automobile as a secondary consideration.

4. Proper supervision to provide for continuous maintenance of trunk highways between important industrial centers.

5. Building completely around London a great circular boulevard and highways, which would induce thousands and thousands of persons to establish homes in the suburbs. This also would provide speedy motor transit around the city, instead of through it, thus saving much time and reducing accidents.

6. Removing restrictions, such as the speed limit on open roads, making the rate forty miles an hour instead of twenty, which no one observes.

7. Providing homes for the teeming thousands in crowded London by taking them to the suburbs by motor passenger lines.

"We have been endeavoring to build up our road system and motor-freight routes for some time," said Mr. Joynson-Hicks. "The entire housing question and all road communication in agricultural districts depend upon motor transport, and this can be provided only by mechanical vehicles run on properly prepared roads.

"There used to be a feeling against the development of roads before the war, so many of the people believing that automobiles were only for pleasure purposes. I tried to have more attention paid to the subject, but was hooted at. But now, with the war, there has come a change of sentiment. We have all seen the great use to which the motor lorry was put in the war, what a tremendous part it played. To illustrate: At the start we laid down small railroads in France for transportation up to the front. The lines became congested and their services were limited. Motor lorries had to be sent out to take the material off the railways and then deliver it to the front. Then came the long trains of motor lorries—and fine roads were constructed through Belgium. These roads were not trench roads, but real highways, all British built. There were 70,000 men working constantly, repairing and rebuilding, with remarkable speed, even roads torn up by shell fire only a few days before.

"Development of the motor lorry service throughout England would mean a tremendous boon to commerce and to the suburban sections. We are very badly off for housing in England. The development of motor passenger lines into the open country would of course mean the opening of fine suburban sections. The motor truck route would supply those sections."

"Is there a central body now with power to compel the maintenance of motor truck routes?"

"The Road Board sets aside so much money for certain improvements. A community comes to it and says it needs so much to repair a certain section. The Road Board gives it the money. The Road Board can suggest that a certain stretch be put in good condition; but it cannot compel it. If the community refuses, of course the board can withhold the money. The committee wants to see more authority given to the board."

"How urgent is the necessity of giving motor truck relief to the service that the railroads are now rendering?"

"The railroads to-day do not meet the demands. There is a greatly increasing bulk of freight. In most sections of the country the tunnels are so low that many of the things demanded for new and more modern factories can not be carried through. Enormous boilers and such devices must be moved on motor trucks. They can not go through the tunnels. In many cases the motor routes should parallel the railroad, but generally speaking they should be laid down for the undeveloped sections. There would be great saving in time and the labor lost in the numerous times ordinary freight is handled from the time it leaves the factory until it arrives at its destination. The control of the highways and development of motor freight routes must be independent of the control of the railways. We fear that if the government gave control of the roads to the railroads they would kill the trunk proposition just as they killed the canals. There would not be a real development, for quite obvious reasons."

"What restrictions must be removed from the automobiles?"

"One of the things badly in need of amendment is the old 20-mile speed limit, which came into operation in 1903, as a temporary measure. No one ever thinks of adhering to it. If there is to be a speed limit at all it should be, say, 45 miles an hour on the open roads. Twenty is childish."

Colonels Plan Tour

The Central Kentucky Motor Truck Dealers' Association, at a meeting in Lexington, decided on a four-day tour of Central Kentucky counties with a fleet of motor trucks, beginning Monday, Feb. 16, visiting Nicholasville, Frankfort, Lawrenceburg, Salvisa, Harrodsburg, Danville, Stanford, Lancaster, Paint Lick, Richmond, Winchester, Mt. Sterling, Sharpsburg, Carlisle, Millersburg, Cynthiana, Paris and Georgetown in the order named. The plan is to have talks in each of the towns visited by members of the Truck Dealers' Association.

Canada in Tractor Trade

Narcisse Savoie, Quebec minister of agriculture, heading a delegation of forty Canadian agricultural experts, visited Cleveland recently to see how tractors are manufactured. Canada is starting a back-to-the-farm movement that, in the opinion of Mr. Savoie, is to have great effect in lowering the cost of living.

"Application of modern methods to farming is going to accomplish wonders in the next decade," the minister predicted. "Our province has entered into an agreement with the Cleveland Tractor Company whereby we will receive every year thousands of tank type tractors. With eggs selling at $1 a dozen and with unprecedented prices for butter, meats and grains, it is vitally necessary to increase crop production. That is one sure way to end the general unrest."

With Mr. Savoie were professors and instructors from agricultural colleges, representatives of newspapers and nearly a score of Catholic priests known in the province as "agricultural missionaries."

The Leach-Biltwell Motor Company, of Los Angeles, has purchased the plant of the Republic Truck Company in Los Angeles. This gives the purchasing company 12 acres of ground, with three large buildings, besides office building, dry kiln, pump house, loading dock, spur tracks, etc. The plant is three miles from Los Angeles with direct Santa Fe railroad connection. The new plant cost $250,000.

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General Motors Trucks

Cashing In On GMC Model 16 Demand

The dealer who sells Model 16, GMC ¾ to 1 Ton Truck, supplies a big demand—a demand that comes practically unsolicited.

Model 16 meets the big growing need for an all-around truck, and as a result production has rapidly increased in the GMC factory.

The whole country has been looking for the all-around truck, and has found it in Model 16.

When the Government standardized on GMC Model 16, it was selected for both the ¾ ton and 1 ton classifications.

It had the speed and flexibility for the one, and the chassis strength and motive power for the other.

General Business has recognized the wisdom of the Government's choice by selecting Model 16 in larger and larger numbers.

GMC Trucks are made by the exclusive truck-making unit of the General Motors Corporation.

GENERAL MOTORS TRUCK COMPANY

One of the Units of the General Motors Corporation

PONTIAC, MICH., U. S. A.

(598)

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Do you sell lining —or just put it on?

YOU can put on as much brake lining as people ask you to every year—and that may not be much. Two cars out of ten may actually need brake lining, yet they get out if you don't go after the business.

Don't wait to be asked—tell the motorist about brake-lining, and sell it to him. The quickest way to sell brake-lining is to mention Non-Burn.

Johns-Manville Non-Burn is designed and advertised to help you sell it. It is a representative Johns-Manville Asbestos product that it will pay you to push.

Moreover, our Sales Policyassures you real trade protection. Write for details.

JOHNS-MANVILLE SERVICE COVERS THE CONTINENT

Through—

Asbestos

and its allied products

JOHNS-MANVILLE
Serves in Conservation

Heat Insulations, High Temperature Cements, Asbestos Roofings, Packings, Brake Linings, Fire Prevention Products

JOHNS — AUTOMOTIVE

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How do you sell Hubodometers?

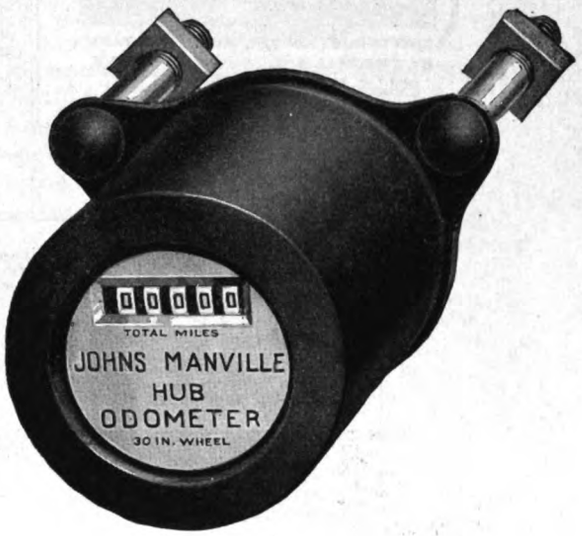
SUGGEST to the man who has just bought a car or truck that, in these times of soaring prices, he can keep most accurate track of his running expenses with a Johns-Manville Hubodometer.

You'll probably find that your profits on a little sales-talk like this will be a dollar a minute.

Try it, and see if we aren't right.

Price $12.00; $12.50 West of Denver

H. W. JOHNS-MANVILLE COMPANY, New York City
10 Factories—Branches in 63 Large Cities
For Canada, Canadian Johns-Manville Company, Ltd., Toronto



MANVILLE EQUIPMENT

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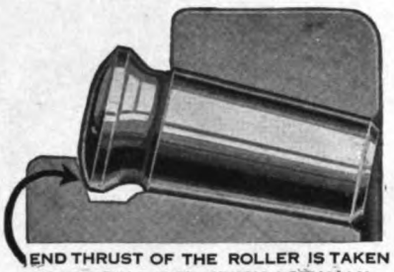
Stan-Par and PRODUCTS



END THRUST OF THE ROLLER IS TAKEN BY THE BALL END WHICH ACTUALLY ROLLS WITHOUT SLIDING.

Stan-Par Axles

Bock Taper Roller Bearings

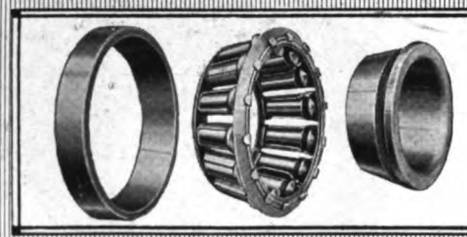
Stan-Par (Perfection) Springs

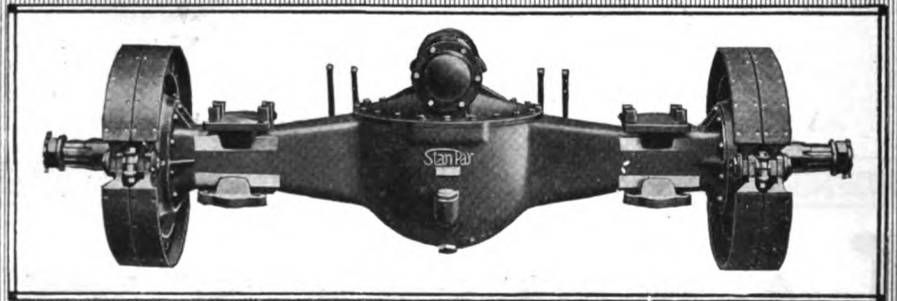
Stanweld Rims

Stanweld Tubing and Tubular Parts

Brake Rods and Rod Assemblies

Forgings





THE STANDARD PARTS COMPANY
Executive Offices, Cleveland

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the Stan-Par IDEA

Sound Engineering

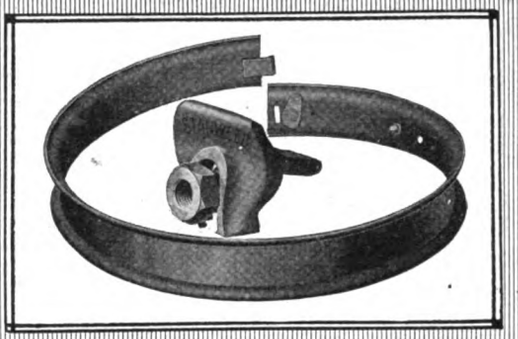
Correct Manufacturing

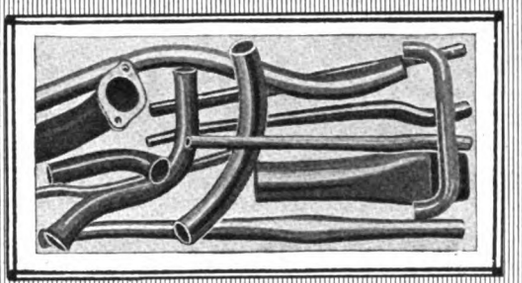
Dependable Performance

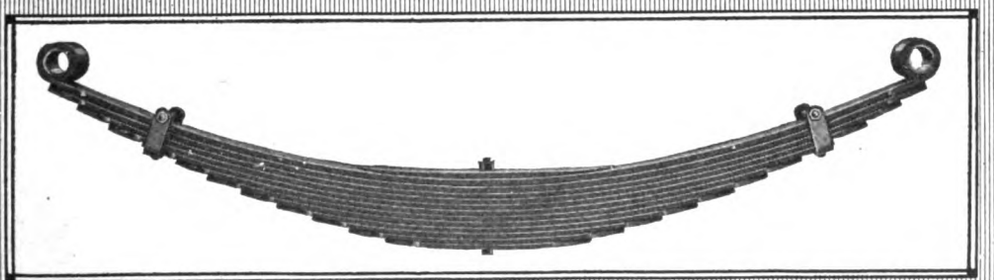
Intelligent Service

Pleasant Business Relations—

With All Proper Respect for and a Welcome to Competition







THE STANDARD PARTS COMPANY

Factories: Cleveland, Toledo, Canton, Cincinnati, Flint, Mich., Pontiac, Mich., Wheeling, W. Va., Connersville, Ind.

Please mention "Power Wagon" when writing to advertisers.

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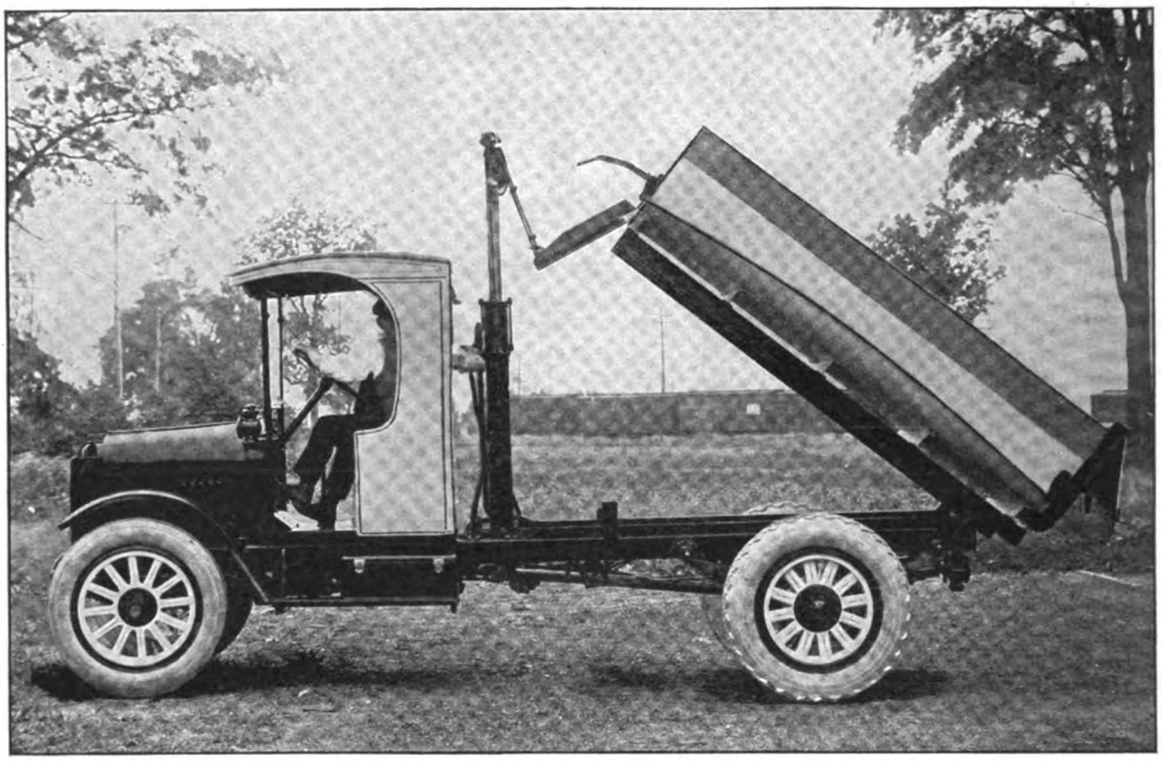

Are You Interested In Dumping Equipment?

Do you know--

THAT—over 90% of the motor truck manufacturers in the United States use WOOD HYDRAULIC HOISTS and STEEL DUMPING BODIES exclusively as standard equipment?

THAT—thousands of truck owners use our equipment and everyone is a booster for our product?

THAT—we can install our equipment on any chassis?

THAT—our SERVICE is the BEST?

Send us your specifications and let us convince you of these facts

Wood Hydraulic Hoist & Body Company

CHICAGO **DETROIT** (Factory) **NEW YORK**

Please mention "Power Wagon" when writing to advertisers

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U S MOTOR FLOATING POWER PLANT TRUCKS

"As Good As Its Name"

The Hit of the Chicago Show

More dealers appointed—more trucks sold—than by any other two truck manufacturers who exhibited there.

Forty new dealer contracts closed—five hundred trucks sold—that's what UNITED STATES MOTOR TRUCKS did at Chicago—and here are the reasons, as we heard them from dealers who saw the exhibit:

"A revelation in motor trucks—two years ahead—wonderful construction—unusual refinement of detail—finest line of trucks built—best looking line of trucks I ever saw—half sold when the prospect sees them—certain to give long service—unusually attractive dealer proposition—."

FIVE MODELS

Worm Drive—3,000, 4,000, 6,000, 8,000 and 12,000 pound capacities. Also 1½ ton Farm Truck with five-way convertible U. S. Standard Farm Body. This complete line is the

LATEST WORD

in motor truck, design, construction, quality, efficiency and economy of operation.

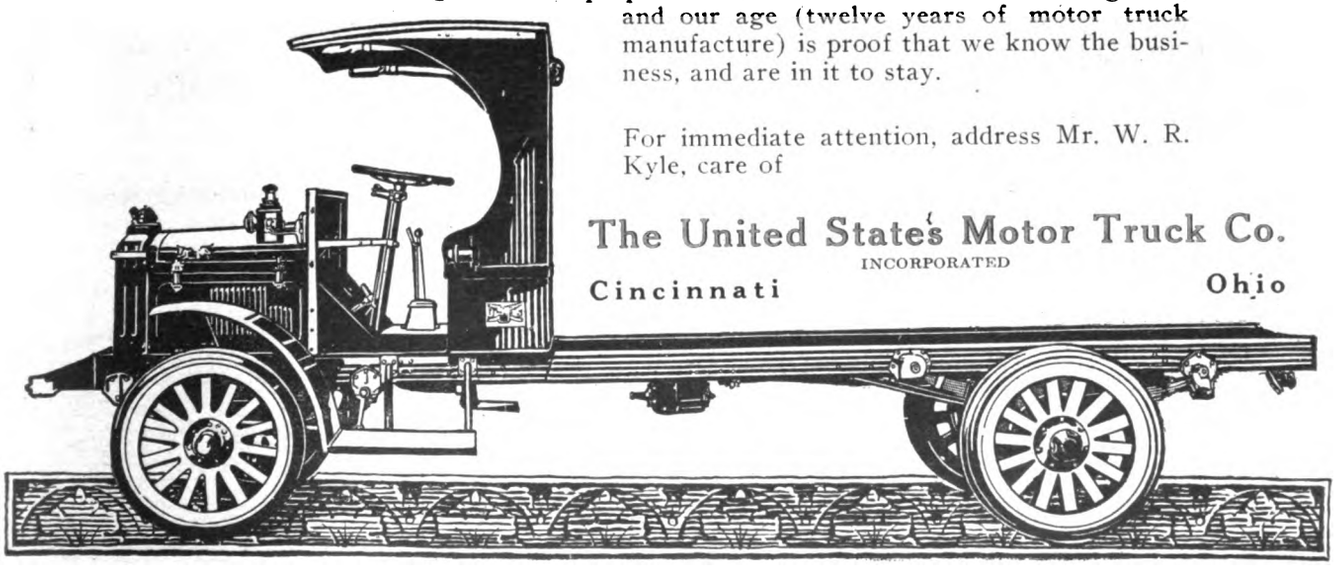
DEALERS: You want to build for the future. You want to sell the same truck line year after year. You want trucks that will SELL. U. S. is the answer. This is the line you should handle, for it is two years ahead of the others, and will STAY ahead.

The fellows who saw the line at Chicago closed on the spot. Nowhere else could they find a line of trucks completely answering the user's requirements, so dependable, both to serve the customer and make money for you.

Are you going into the motor truck business? If in it, are you dissatisfied with your present connections? Are you considering a change? Then communicate with us, for your own good. Our proposition will stand the closest investigation, and our age (twelve years of motor truck manufacture) is proof that we know the business, and are in it to stay.

For immediate attention, address Mr. W. R. Kyle, care of

The United States Motor Truck Co.
INCORPORATED
Cincinnati Ohio



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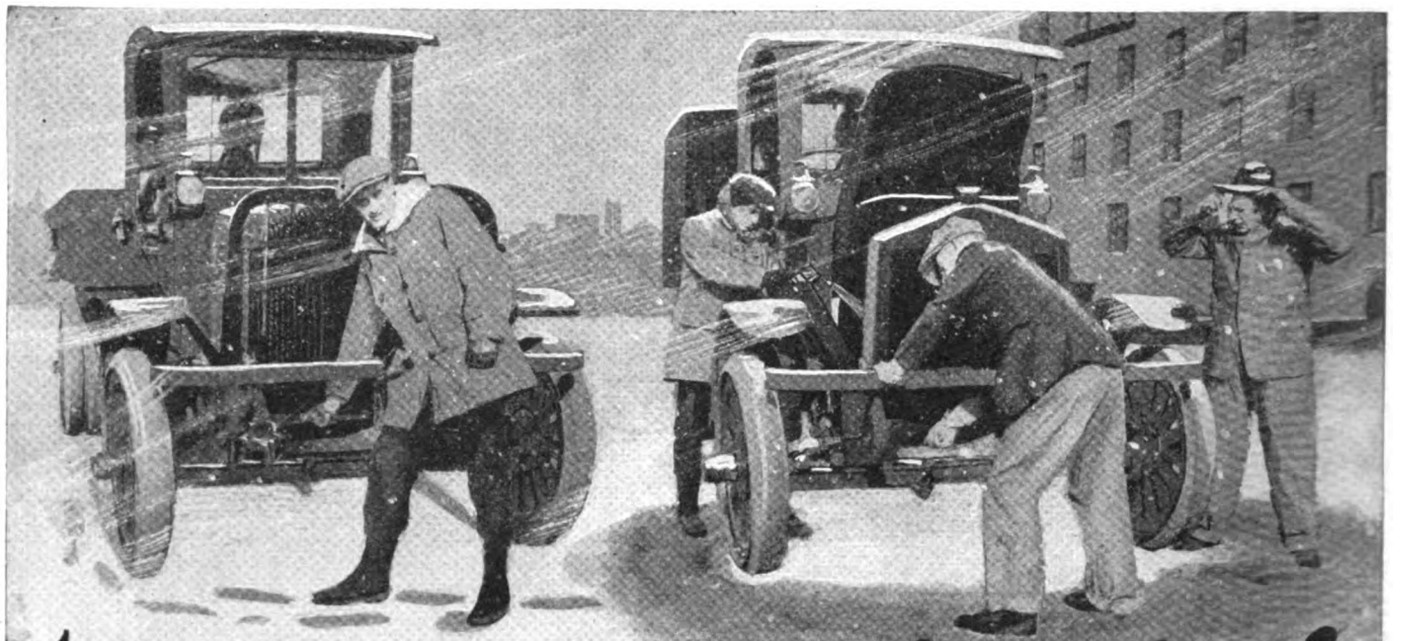
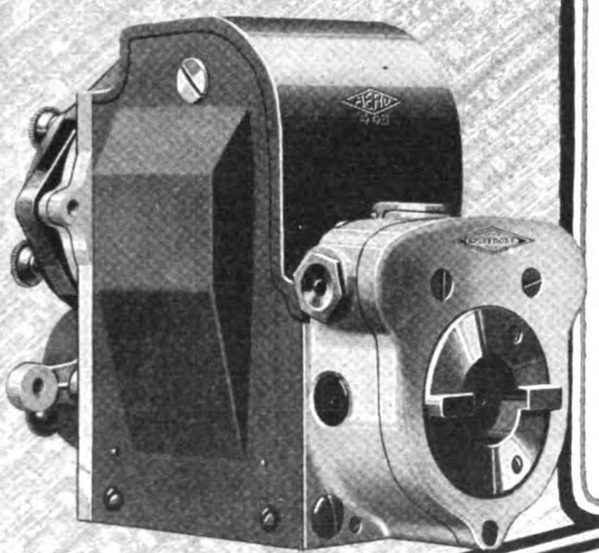


¼ turn vs. spinning

Splitdorf "Aero" Magneto with Enclosed Automatic Impulse Starter

Standard equipment on such trucks as Mack, Pierce-Arrow, Garford, etc.



A cold, stiff engine will start easily if equipped with Splitdorf Magneto and Enclosed Automatic Impulse Starter. No back-breaking effort necessary even when the thermometer hovers around zero.

The Impulse Starter is a part of the coupling used in driving the magneto.

A quarter turn of the crank shaft, on compression stroke, releases a spring within this device. The released spring energy twirls the magneto shaft to a speed far in advance of the crank shaft speed, producing an extra hot spark in the charge to be fired. The stiffest engine starts instantly.

The cutting in and cutting out of the Splitdorf Impulse Starter is entirely automatic. When the Impulse Starter is functioning the spark is automatically retarded regardless of spark-lever position, positively eliminating back-firing.

Safe and dependable—always dependable.

SPLITDORF ELECTRICAL COMPANY
Newark, N. J.

TRADE
SPLITDORF
MARK

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1,000 pages.
Thumb indexed.
Size 9 x 12 inches.
Bound in stiff covers.

$5.00 PER COPY
($6.00 outside the United States and Canada)

Features of the Book

The 1920 edition of the "Reference Book" will contain 92 full pages (9x12 inches) of specifications of motor trucks, trailers, farm tractors and passenger cars. There will be approximately 134 pages of blue prints of these models, showing plan and elevation views. The 500 pages of text, in addition to the above, will afford a vast volume and great range of information to all who are interested in the production, sale or application of trucks, trailers and farm tractors.

The "POWER WAGON REFERENCE BOOK" for 1920 will be the most useful piece of trade literature ever printed. Its purpose is to supply the vital facts of the industry and, through their presentation, expand the market.

Subscription Payable in Advance

Invaluable for Factory Executives—Engineers and Sales Managers——

THE "POWER WAGON REFERENCE BOOK," after only one year's circulation, has taken first rank among the text books of the industry. It is the most frequently consulted book of its kind in existence. It is as reliable as it is informative. Every sales manager, engineer, and factory department head should own a copy. The

POWER WAGON REFERENCE BOOK FOR 1920

will be far superior to the 1919 edition. The new book will contain about 1,000 pages, three-quarters of which is devoted to comprehensive studies of every feature of automotive design and equipment. In addition it presents 42 detailed studies of the application of motor trucks in as many branches of industry. The tables supplied in connection with these 42 studies of motor truck application represent the most valuable, painstaking, and accurate analyses of market ever presented to the trade. Nothing so useful or enlightening as these tables has ever been printed.

Engineers in need of information upon such subjects as axles, transmissions, engines, magnetos, steering gears, radiators, clutches, wheels, frames, etc., have only to refer to the encyclopaedic text section of the book, where what they seek to know is disclosed. They can see at a glance what products are on the market.

The 1920 Book Will Be Ready Early in February

Order now—today, if possible—and save yourself the disappointment of not being able speedily to secure a copy at a time when we are hard pressed to make deliveries. Orders will be filled in rotation as they are received.

The Price is $5.00---Payable in Advance

($6.00 outside the United States and Canada)

and in it is included one year's subscription to "THE POWER WAGON." If you are already a subscriber to "THE POWER WAGON" and wish to obtain a copy of the 1920 "Reference Book" as soon as it is ready for distribution, send us $5.00 and your present subscription to our monthly journal will be extended for the period of one year from date of expiration.

POWER WAGON PUBLISHING CO.
544 Lake Shore Drive Chicago, Ill., U. S. A.

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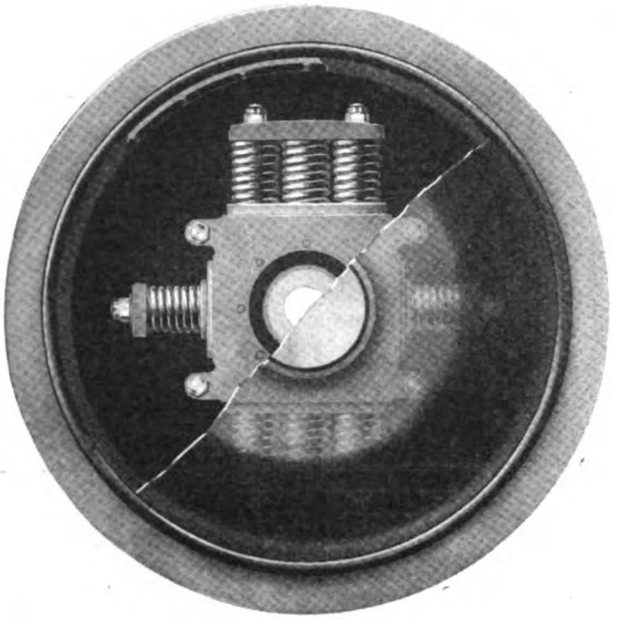
You Double the Life of Your Truck
When You Stop the Effects of Road Shocks



Springs always remain in this position. They do not revolve with wheel. This insures constant even suspension of load and the elimination of vibration. The Cornfield Wheel is practically indestructible.

Vibration from road shocks is the greatest enemy of the motor truck. It affects the motor, it loosens the frame, it causes greater wear on every working part.

Vibration is the direct result of road shocks. The shock effect of every obstruction on the roadway is carried immediately to the axles, transmission and motor.

Rubber tires overcome a part of the shock, but the tires themselves suffer more from the violent pounding than from natural road abrasion.

The greatest protection known to Automotive engineers for the entire truck is the

Cornfield Resilient Wheel

Pneumatic Results—and More—With Solid Tires

The Cornfield Resilient Wheel entirely neutralizes the ordinary road shock. It stops the effect of the greater shocks before it reaches the motor. It cushions the entire chassis.

Tires on Cornfield Resilient Wheels that have run 3,500 miles show no effects from the constant pounding on uneven pavements, even when trucks are constantly overloaded.

You need Cornfield Resilient Wheels on your motor trucks.
They will keep your truck out of the repair shop.

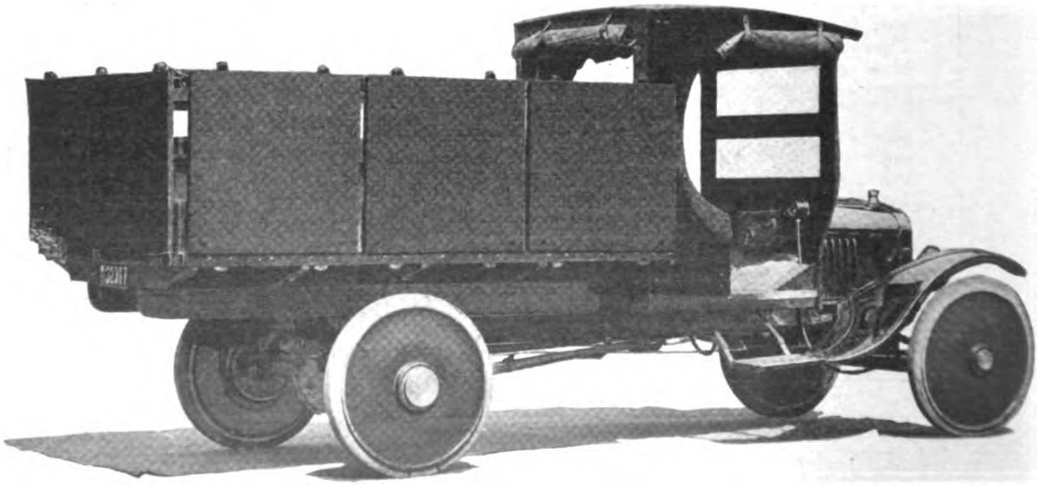
Send for the Cornfield Booklet

Cornfield Wheel Co., Inc., Anna Place, Detroit, Michigan

CORNFIELD RESILIENT WHEELS
For Ford Trucks
Now Being Delivered in Full Sets

The remarkable records made by Ford One-ton Trucks equipped with Cornfield Resilient Wheels will be of interest to every operator of light trucks.

Six months' service without a dollar spent for repairs, loads of 3,000 to 5,000 pounds; tires show no effects of road pounding, wear from natural abrasion only.



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Strom BEARINGS

THE high standard of quality to which Strom Bearings are built is reflected in the unusually satisfactory service they are giving in many lines of industry. It is only logical, therefore, that the demand for Strom Bearings has increased from the first and that today it is greater than at any time in our history.

U.S. Ball Bearing Mfg. Co.

(Conrad Patent Licensee)

Palmer Street and Kolmar Avenue Chicago, Illinois

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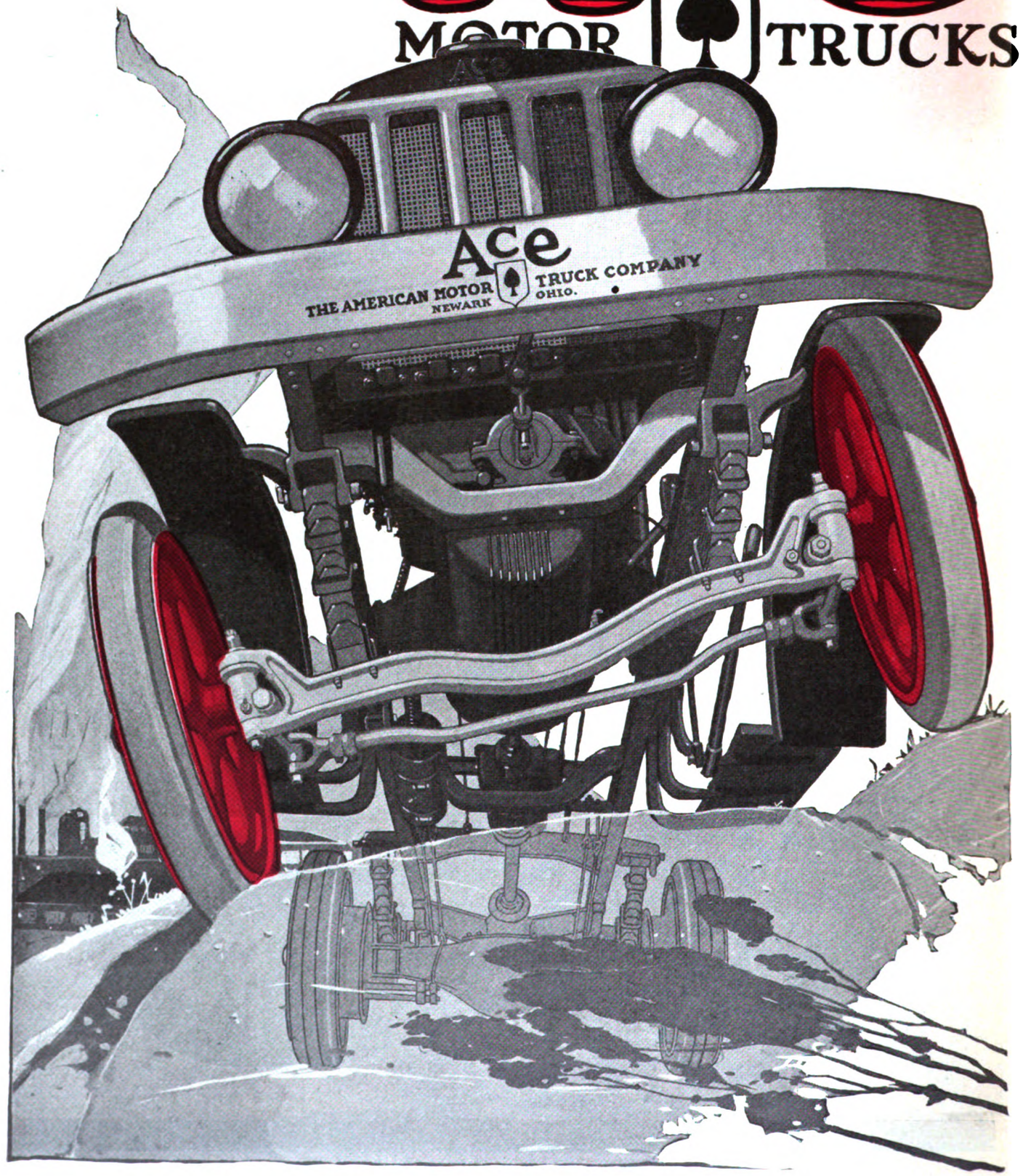
Ace MOTOR TRUCKS



Please mention "Power Wagon" when writing to advertisers

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flexible

Body flexibility in a Motor Truck depends on the springs, the universal joints, the engine supports and the parallelism of structural parts.

When these factors are at their maximum, the live power of the truck is most fully available for effective work.

A stiff Truck is a drag on fuel.
A flexible Truck saves power.
A stiff Truck breaks where it can't bend.
A flexible Truck yields to strains.

The Result of Deliberate Design

Ace Trucks have road-flexibility.

Ace Trucks have load-flexibility.

Ace Trucks have power-flexibility.

Ace Trucks have service-flexibility in the readiness with which they lend themselves to differences in haulage problems, geograghical conditions, seasons, climates, operators and all the variables of usage.

1½-2 Ton $2800.00 2½-3 Ton $3500.00

¾ Ton and 3½ Ton, to be announced.

Ace

The AMERICAN MOTOR TRUCK COMPANY
NEWARK OHIO.

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SAVAGE AXLES

PREVENT BURNING UP YOUR TIRES

TIRES under Savage Axles have an honest chance to live their normal life.

It is the pound, pound, pound of the unsprung weight that has most to do with the shortening of truck tire life.

Savage Axles being extremely light offer the least possible unsprung weight for tires to carry.

SAVAGE ARMS CORPORATION
SHARON, PA.

UTICA NEW YORK DETROIT

SAVAGE

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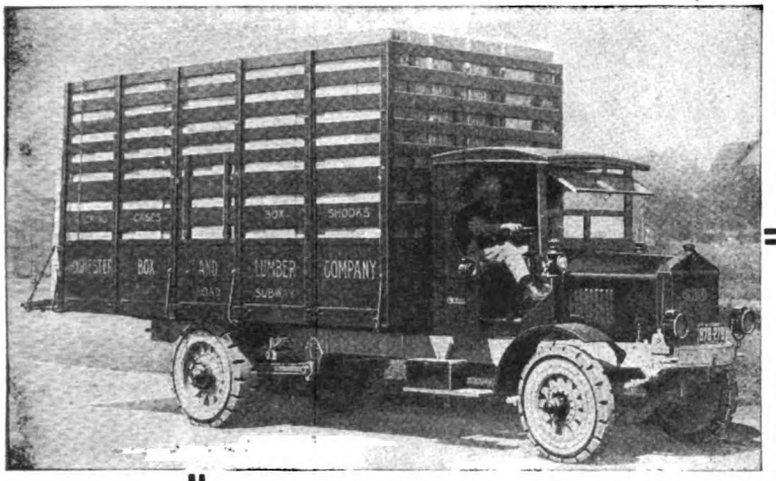

Reliability---
Of Manufacturer

A Selden Dealer said: "What the Selden Corporation say they will do—they do."

THE reliability of the manufacturer of the motor truck you sell to your friends and patrons should be a "first consideration." The Selden Dealer quoted above expressed the feeling of all Selden Dealers—a knowledge of Selden determination to fulfill all promises.

Financially the Selden Truck Corporation is one of the strongest in the trade, perfectly able to back up Selden Motor Trucks and Selden Policy of Square Dealing, to the limit.

The steady, consistent growth of the Selden Organization at home and abroad, is a strong testimony of the reliability of the Selden Corporation.

To satisfy our distributing organization, to satisfy the Selden Owners, the policy of the Selden Truck Corporation is and always has been—"We Will Live Up To Their Highest Expectation."

And we have succeeded—ask any Selden Dealer or Owner.

The Magazine, "Truck Transportation" will be mailed to those interested

IN-BUILT QUALITY · Selden · MOTOR TRUCKS

Selden Motor Trucks 1½ to 5 tons capacity

Selden Truck Corporation

ROCHESTER, NEW YORK

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Victor

Worm Drive Motor Truck

VICTOR motor trucks give real service. Repeat orders and satisfied users are sufficient evidence of that. It is the logical result of high standards of workmanship and long experience in building the Victor motor truck.

Capacities 1½ and 2½ tons.

Write for particulars.

Victor Truck Company

St. Joseph **Michigan**

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ANALYZE YOUR FIELD FOR SALES POSSIBILITIES

Where Are Your Sales Low?
Where Can You Increase Your Sales?
Where Is Your Best Field This Year?

With our statistical service you can check up your sales possibilities and find out just where to concentrate your efforts. Visualize your markets—no lost motion in overworked localities, no lost sales in underworked districts.

Passenger Cars—

Our statistical service will give you the exact number of cars of every make (taken from their official state registration) in every town, city, county, and state in the United States.

Motor Trucks—

The number and make, lists of all Fleet Owners of 3 or more trucks, in every city in the United States.

This means an intelligent, thorough and systematic analysis of marketing conditions and business possibilities for every locality. Such information means better and more definitely planned sales efforts for the—

Automobile Manufacturer
Tire Manufacturer
Accessory Manufacturer

Our statistics are serving some of the largest Automotive concerns in America. An organization of 300 people in Des Moines, and 100 more in our branches at Cleveland, Detroit, and Newark, keep our data up to the minute. We have a book of information, sales data, and statistics which we will gladly send to you free of charge. Write for it today—it is of value to you.

PAGE 6	MARYLAND TOWN COUNT			6/30/1918.
CARROLL CO.	AUTOS	FORDS	TRUCKS	M C
Alesia	23	11	2	4
Asbestos	11	5	1	1
Carrollton	14	6		
Detour	26	11	2	
Finksburg	51	19	3	3
Gaither	4	3		
Greenmount	28	8	1	
Hampstead	197	62	12	3
Henryton	3	1		
Hoods Mills	9	3		
Keymar	52	24		2
Kump	6	3		
Lineboro	50	28		
Linwood	11			2
Manchester	107	41	4	4
Maple Grove	8	3		
Medford	13	5		
Middleburg	25	8		4
Millers	26	14		
Morgan	4	1		1
Mount Airy	309	163	2	14
New Windsor	151	58	2	3
Patapsco	197	18	4	4
Sykesville	177	92	6	4
Taneytown	228	107	5	10
Tannery	4	3		
Union Bridge	217	104	3	18
Waterville	7	2	1	
Westminster	812	340	40	49
Woodbine	161	72	4	7
TOTAL	2931	1205	92	133
CECIL CO.				
Aikin	14	11		
Blythedale	7	4		
Cecilton	54	28		1
Charlestown	5	1		4
Chesapeake City	86	21	2	1
Childs	37	17		
Colora	57	35		
Conowingo	12	7		1
Earleville	37	19	1	
Elk Mills	11	4		
Elkton	287	136	4	7
Georgetown	25	7	1	
Iron Hill	4	4		1
Leslie	3			
Liberty Grove	16	11		
North East	132	75	5	4
Perryville	53	25	4	4
Port Deposit	122	78	2	2
Principio Furnace	9	5	1	5
Rising Sun	171	80	2	
Rowlandville	18	11		
Sylmar	5	2		
Warwick	26	11	1	1
TOTAL	1191	592	23	51

To the left is shown a reproduction (reduced) of one of the sheets from our annual Passenger Car and Truck distribution analysis. Figures as Oct. 1, 1919, are being compiled now.

Motor List Company

405 4th Street DES MOINES, IOWA

BRANCHES:

Chas. G. Tobin, Manager
633 Huron Road Cleveland, Ohio

163 Griswold Street Detroit, Mich.

Edw. G. Pratt, Jr., Manager
26 Treat Place, Newark, N. J.

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KISSEL TRUCKS

5 capacity models

A Truck feature that will interest you at the Motor Truck Show this week is that the units in the Kissel truck chassis are oversized—the Kissel-built motor, the frame, springs, axles, brakes—big, sturdy, dependable truck units—each are built for real truck service.

The dominating thought in every step of Kissel truck construction for fourteen years has been to "build to prove equal to exceptional service."

Other exclusive Kissel truck features of especial interest to business men are—

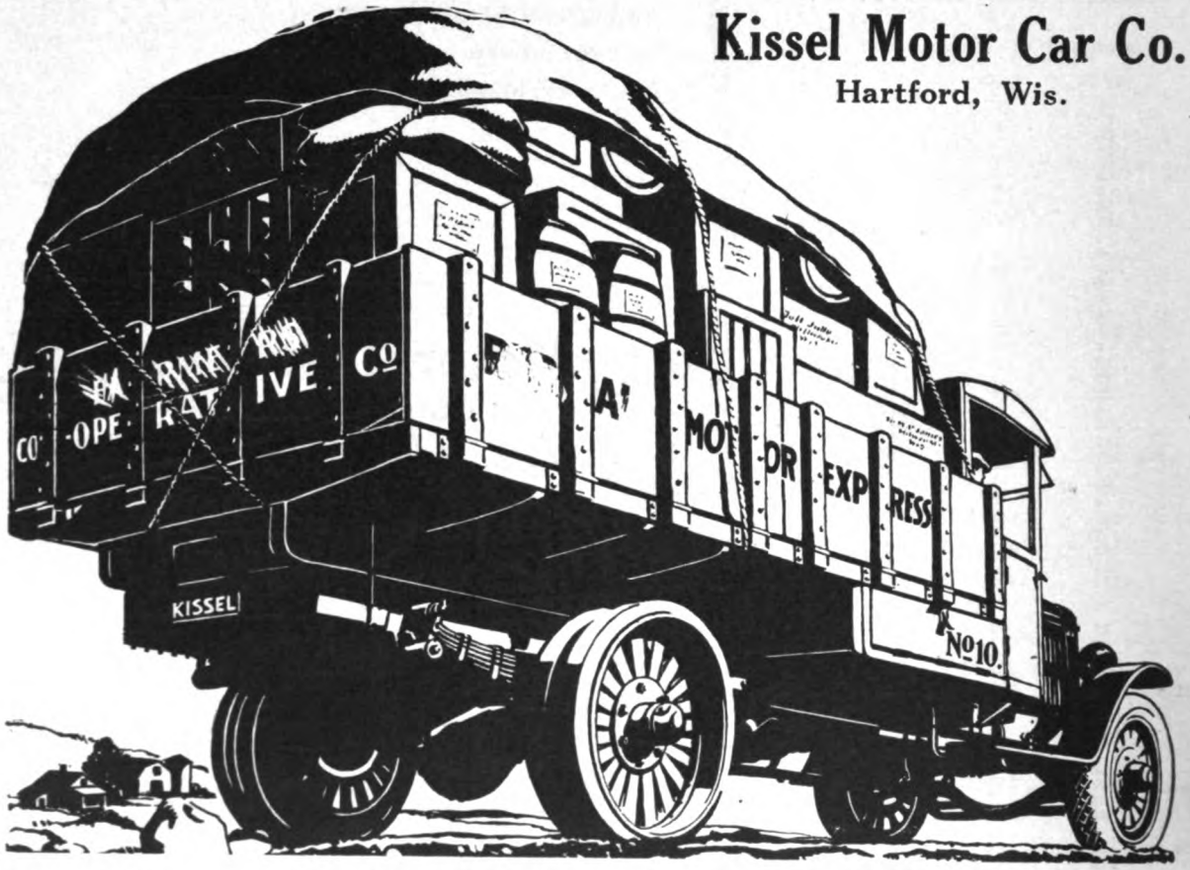
Special display of all Kissel truck chassis for every line of business—a size for every purpose.

Special body equipment—the original ALL-YEAR Cab that insures truck operation the year around, and other transportation cost reducing features.

Motor Truck transportation experts in attendance—Data Catalogues free to bona fide business men—

NOW

On display at the National Motor Truck Show, Chicago, Jan. 24 - 31, International Amphitheatre, located south of the loop. Take South Side Elevated Road.



Kissel Motor Car Co.

Hartford, Wis.

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The Piggly Wiggly Stores "All Over the World" Use Highway Trailers to Cut Haulage Costs

Every Truck a Prospect For Highway Trailers

No Overhead Increase to Handle Them. They Sell for $250 to $400 Less Than Average Trailers; Standard Models Accepted by U.S. Army and Navy

Four Wheel Reversible Trailers

1½ Ton Capacity	$625
2½ Ton Capacity	$785
4 Ton Capacity	$1075
6 Ton Capacity	$1395

Every truck in your territory is a prospect for Highway Trailers.

Every truck you sell is a prospect. Every truck your competitors sell is a prospect. They work for you.

Just run through the lists of truck owners in your field, see what profits are ready for you.

Highway Trailers are U. S. Standard

The United States Government, operating more than $1,000,000 worth, proved they cut haulage costs 80% to 90%.

Such experts of transportation as the Timken-Detroit Axle Co., the Cadillac Motor Car Co., and the Consumers Company of Chicago, whose prestige is great in influencing the decision of other truck operators, employ large fleets of Highway Trailers.

Don't you think you can sell the Trailer that customers like these buy?

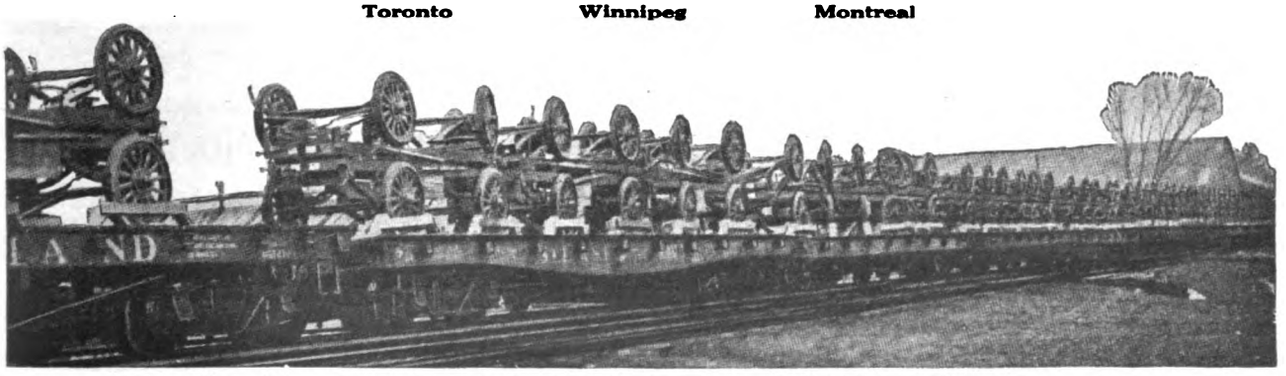
Someone in your territory is going to get these big profits and advantages of the Highway Trailer franchise. Why not you? Write or wire.

Highway Pipe and Pole Trailers

2 Ton Capacity	$510
3 Ton Capacity	$655
5 Ton Capacity	$955
10 Ton Capacity	$1495

HIGHWAY TRAILER
EDGERTON WISCONSIN

Canadian Distributors, **GRACE MOTORS LIMITED**
Toronto Winnipeg Montreal



One of Many Shipments of Highway Trailers for the U. S. Government, Which Adopted Them As a Standard

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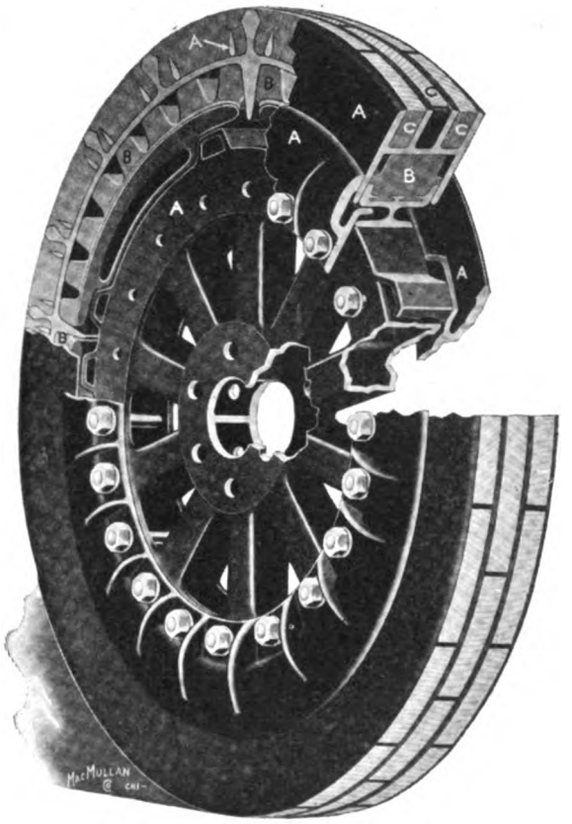
Steel Cushioned Wheels

RESILIENT TRUCK WHEELS

Mead Cushioned Wheels

A Practically Perfect Wheel for Trucks, Tractors and Trailers



This Wheel Excels in Resiliency, Efficiency, Durability and Economy.

Simple in Construction

Mechanically Correct in Construction

Vibrations and Hammer Thrusts from Road Contact are Absorbed in the Wheel

Reduces Gasoline Expense 25%

Reduces General Upkeep Expense More than 50%

Protects the Engine and Chassis against Crystallization

The Wheel Designed with a Knowledge of Traffic Conditions

A Practically Perfect Wheel for Any Truck on Any Road with Any Load

This Wheel Meets the Growing Demand of Truck Users for Reducing Upkeep, and for Protection from Engine, Tire and Chassis Troubles.

A Wheel With Perfect Drawbar Pull

This Wheel Rides with the Resiliency of Pneumatic Tires and is not injured by Oils, Acids, Salts or Other Chemicals, because the Rubber is fully protected.

Initial Investment Compensated by Reduced Aftercost Plus Upkeep

PITTSBURGH TRUCK WHEEL CORPORATION
General Offices: 624 Bessemer Building
PITTSBURGH, PA.

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TRAYLOR

Why our dealers must make good

For many years the Traylor Engineering and Manufacturing Company have enjoyed the highest reputation in engineering, manufacturing and financial circles. The TRAYLOR Truck we know will continue to uphold that reputation. Our fully equipped factories are prepared to DELIVER big production and have started their work. Our Sales Department is going to put TRAYLOR Trucks in service throughout the world. And this entire organization is back of our dealers.

Each and every one of our dealers must make good—to us, to himself and to the TRAYLOR Truck buyer. We want the dealer who wants to build a permanent, profitable business. If you are the man who can keep up the pace we are going to set through our advertising and sales campaign, write or wire us for exclusive dealer proposition.

Traylor Engineering & Manufacturing Company

Truck and Tractor Division **Cornwells, Penna.**

2½-Ton Specifications

ENGINE—Buda Model HTU latest type for heavy duty work. Bore, 4¼ in.; stroke, 5½ in.

GOVERNOR—Pierce Governor.

CARBURETOR—Zenith.

IGNITION—Splitdorf Aero type magneto. Model 448, with enclosed automatic impulse starter.

RADIATOR—G. & O. make (square fin and tube removable core). Upper and lower tanks are cast. Extra large filler and cap.

CLUTCH—Multiple dry disc type.

CONTROL—Left side drive, center control. Spark and throttle control on dash, leaving steering wheel free of complicated levers. Specially designed foot accelerator.

STEERING GEAR—Ross—screw and nut type 18 in. wheel.

TRANSMISSION—Four speeds forward and one reverse. Selective type.

SPRINGS—Chrome silico manganese steel throughout. Front, 40 in. long, 2½ in. wide; rear, 52 in. long, 3 in. wide. All eyes bronze-bushed.

FRAME—Pressed steel channel section, 6½ in. deep; 4 in. width of flange, ¼ in. thick. Reinforced with rigid arched pressed steel across members.

AXLES—Front, drop-forged I-beam section. Rear, worm gear Sheldon semi-floating axle, equipped with ball bearings throughout. 7¾ to 1 standard reduction.

BRAKES—Foot brake, internal expanding, 18 in. in diameter. Emergency brake, 18 in. diameter. All brakes inclosed.

WHEELS—Schwarz artillery type with interlocking spokes. Front, 12 spokes, 2 in. wide; rear, 14 spokes, 2½ in. wide.

TIRES—Solid. Front, 36 x 4 solid; rear, 36 x 7 single or 36 x 4 dual, solid.

WHEEL BASE—Standard 150 in.; length of frame back of seat, 142 in. Special wheel base, 170 in.; length of frame back of seat, 164 in.

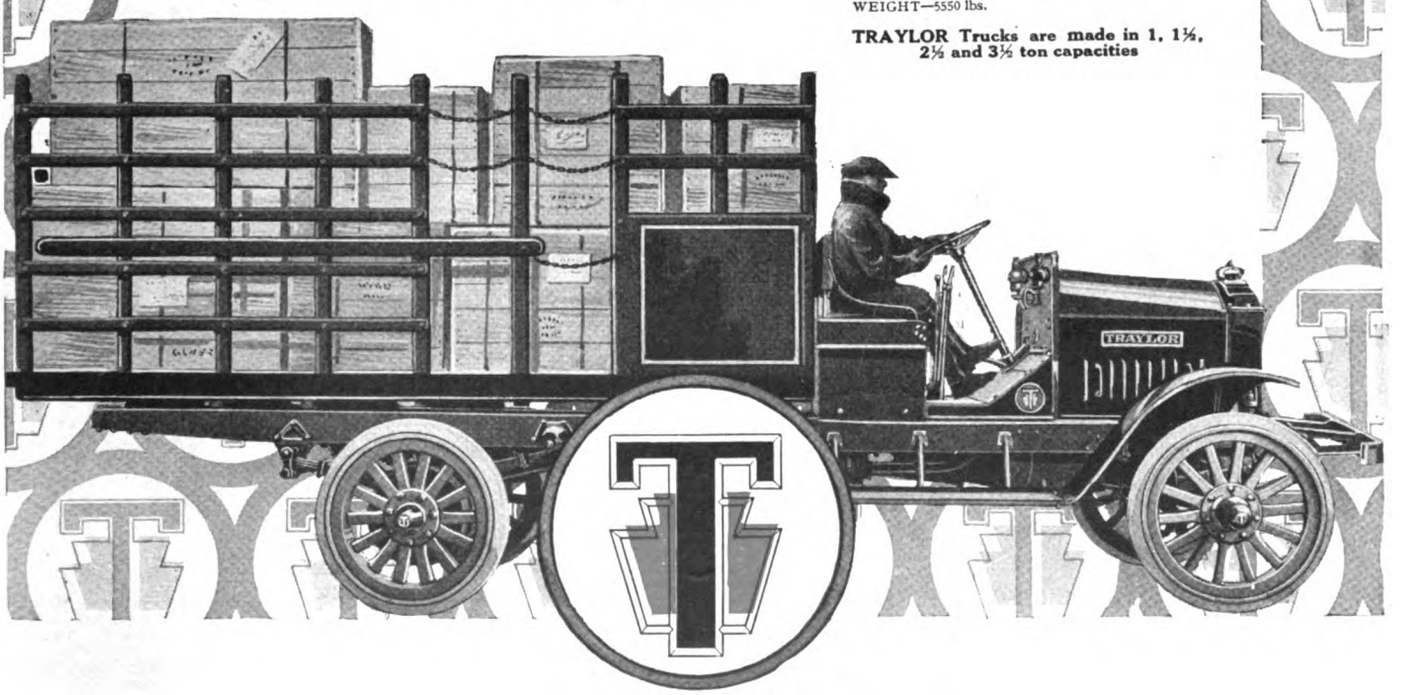
TREAD—Front, 56 in.; rear, 58 in.

GAS TANK—Heavy welded steel, 20-gallon capacity.

EQUIPMENT—Heavy channel steel bumper. Jack and set of tools, tool box, driver's seat, two front side lamps and one rear lamp.

WEIGHT—5550 lbs.

TRAYLOR Trucks are made in 1, 1½, 2½ and 3½ ton capacities



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Firestone Rims -preferred equipment for Cars and Trucks

THEY are the standard equipment on the majority of passenger and commercial cars now manufactured, because they make tire changes easy and get greater mileage from tires.

Firestone Rims have put speed and economy into trucking because they made the use of the Giant Pneumatic tire practical. One man can make a tire change of the largest pneumatic truck tires when mounted on Firestone Rims.

Firestone Rims, whether on passenger car or truck, are an assurance of strength, economy and practical every-day convenience.

The Firestone Steel Products Co.

Firestone Park, Akron, Ohio

TYPE C. Continuous base detachable, demountable rim for passenger cars and trucks. This type of rim, in the 6, 7, 8 and 10 inch size, is the rim which has made the use of Giant Pneumatic truck tires practical for straight side tires

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A MAXWELL Truck hauls 1½ tons—and 75% of all loads carried by horse or motor are 1½ tons or less

Maxwell

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Service Squadrons

Among MACK fleets which are delivering 100% plus, is that of the Kroger Grocery and Bakery Company, with branches at St. Louis, Detroit, Cincinnati and Columbus.

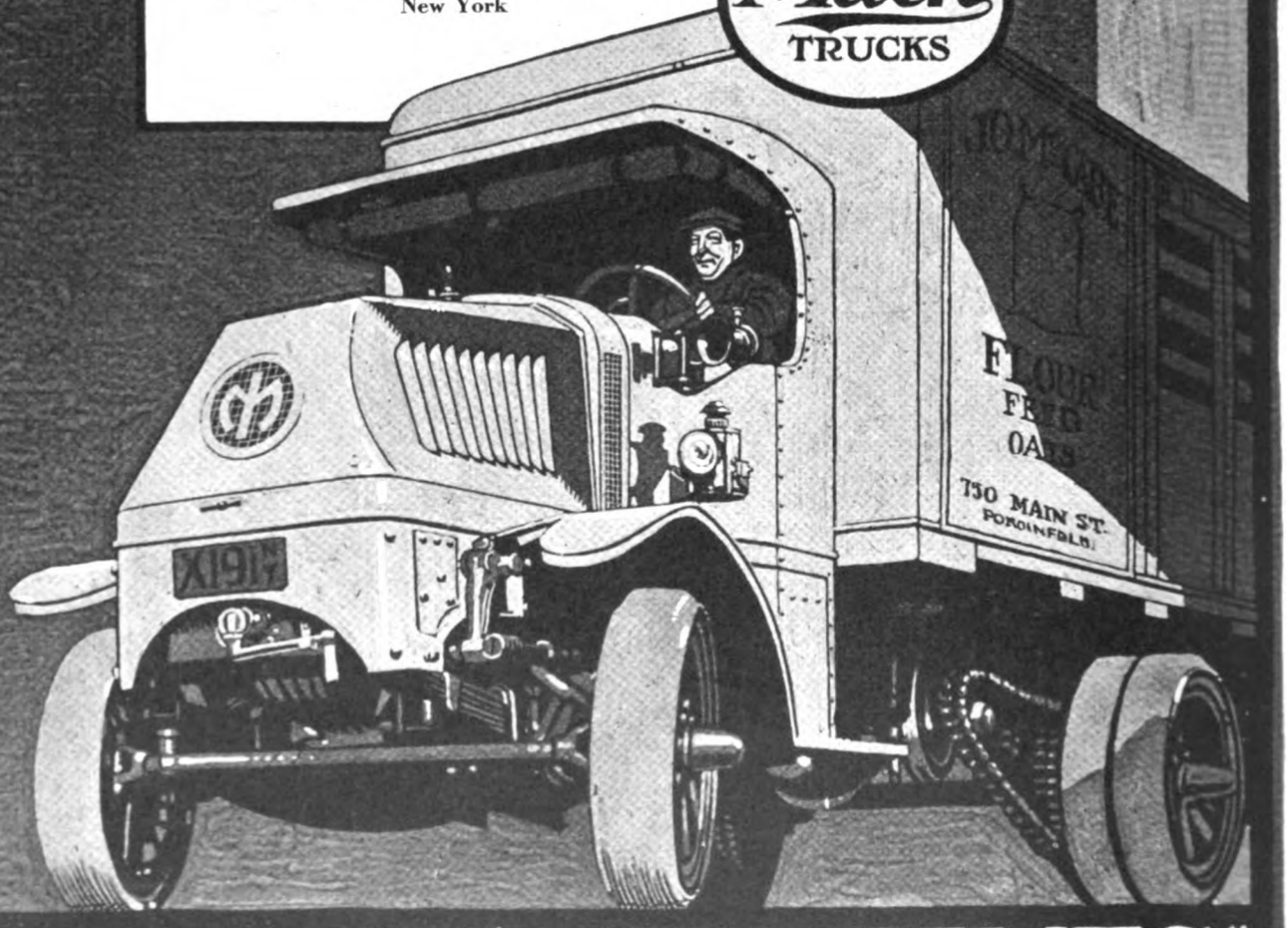
There are now 38 MACK cost-reducers in the various Kroger squadrons. Not only are they under way as quickly as they can be loaded—many of them are equipped with demountable bodies which are discharged with full load and immediately replaced with bodies already loaded for shipment.

Mechanical dependability and operating efficiency of the highest order are required for such continuous, capacity-load road service. That is why the MACK is used.

Capacities 1½ to 7½ tons.

INTERNATIONAL MOTOR COMPANY
New York

Mack TRUCKS



"PERFORMANCE COUNTS"

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MARTIN
CUSHION WHEELS
for Motor Trucks

No bolts
No nuts
Pressed on
Throughout
Light
Strong
Resilient
Durable

Backed
by
Nine Years'
Experience
in Building
Good
Cushion
Wheels

Adopted for Standard Equipment on
"OLD RELIABLE" MOTOR TRUCKS
1½ to 7 Ton

MARTIN CUSHION WHEEL CO.
311-13 N. Sangamon St. **CHICAGO, ILLINOIS**

Branches and Service Stations in All Principal Cities

QUOTATIONS SENT UPON REQUEST

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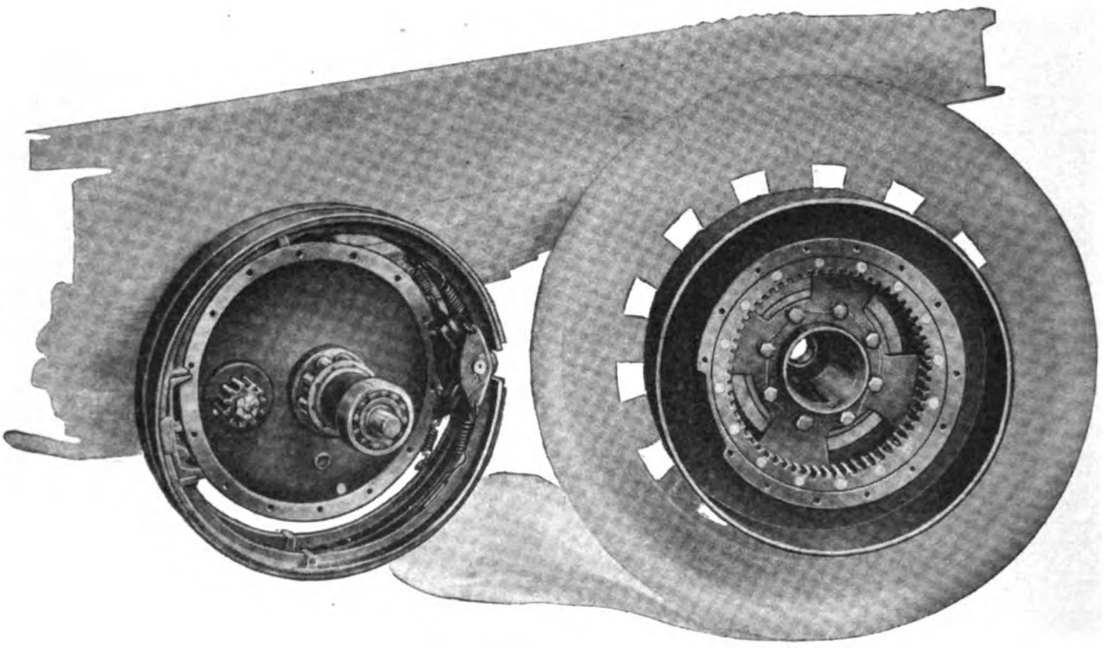
KENNEDY AXLES

FOR HIGH GRADE MOTOR TRUCKS



Showing Method of Enclosing Internal Gear in Oil

KENNEDY AXLES enclose the driving gears in oil-tight drums. Oil flows from hub to hub and the same care is thus given to lubricating every moving part of the axle as is usually given to the differential gears alone. And the result is LONG LIFE and CONTINUED HIGH EFFICIENCY for all gears.

Made in Three Models

	Model 15	Model 25	Model 35
Permissible Load on Spring Pads	5200 lbs.	7500 lbs.	13,000 lbs.

Detailed Specifications and Literature on Request

EXHIBITED CHICAGO TRUCK SHOW

The Hero Manufacturing Company

23rd and Westmoreland Streets, PHILADELPHIA, PA., U. S. A.

Please mention "Power Wagon" when writing to advertisers.

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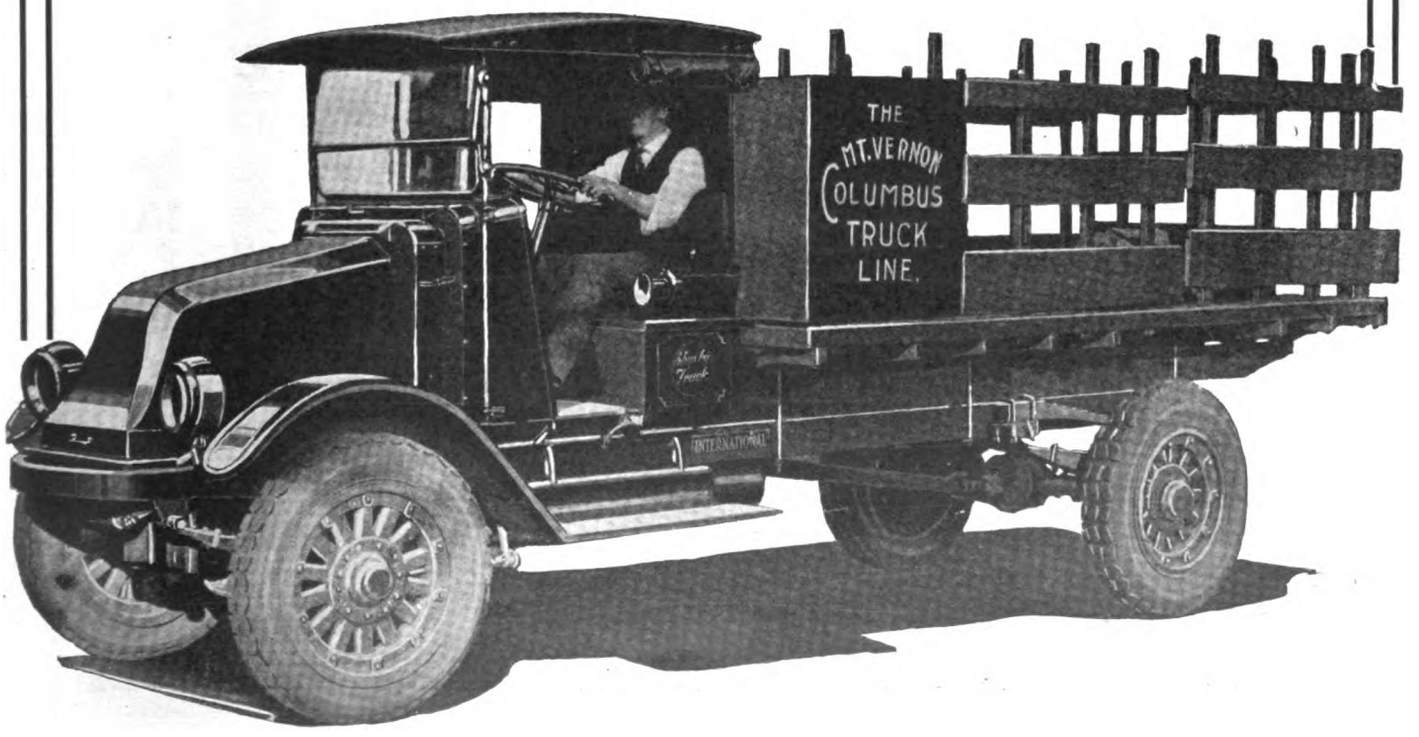
International Motor Trucks

Your business sense, when you come to the contract clinching point as a preliminary to successful motor truck selling, will make certain of something definite and substantial as a background—something like the near-90-year permanence of International Harvester reputation.

That reputation background is the dominent item in **International Motor Truck** success. Analyzed—it is made up of many factors and details, each important and each essential. That reputation has grown out of nearly four generations of satisfaction, and for this company to permit it to lag by the wayside would be in the last degree unwise. It has been bought by long, hard, earnest years of effort; it is being jealously guarded by careful management and workmanship today.

The era of motor transportation is young. Hundreds of the best and biggest dealers of the near future have not yet begun. **International Motor Trucks** are among the few leaders now in total sales. The future for International truck and dealer is one of certain success. International sizes range from ¾ ton to 3½ ton. Write the address below for all the facts in regard to this line of motor trucks—the completeness of International service—the details as to dealers, terms, territory, etc.

INTERNATIONAL HARVESTER COMPANY
CHICAGO OF AMERICA INC. U S A



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HURLBURT

MOTOR TRUCKS

Designed to meet the exacting requirements of the New York Metropolitan district. The Hurlburt is now also making good in other cities.
America's quality heavy duty truck. Endorsed by some of the country's best known firms, and the Federal Government.
Made of the finest materials only. Nickel steel frame. Silicon Manganese springs 60" long. Extra heavy transmission, extra heavy rear axle spindles and bearings. Hurlburt Hindley worm gear a special feature.
Substantially the same today as when first designed eight years ago, and still years ahead of competition. The first Hurlburt is still doing a full day's work.

Consult Users

Four Models 1½-2, 2½-3, 3½-4, 5-5½ Tons

HURLBURT MOTORS, Inc.

8-10 E. 39th St., N. Y. C.

Service Station, 133d St. & 3rd Ave., N. Y. C. **Factory, Harrisburg, Pa.**

HURLBURT

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The Standard Woven Fabric Company

Walpole, Mass., U.S.A.

makers of

MULTIBESTOS BRAKE LINING

announces that the firm name has been changed to

MULTIBESTOS COMPANY

Walpole, Mass., U.S.A.

Multibestos brake-lining is factory equipment on 60% of American motor cars and trucks, including the following:

PASSENGER CARS

American	Cunningham	Haynes	McFarlan Six	Premier
Anderson	Daniels	Holmes	McLaughlin	Saxon
Bell	Davis	Hupmobile	Milburn Electric	Seneca
Briscoe	Detroit-Electric	Jackson	Mitchell	Shaw
Cadillac	Dixie	Jones	Moline-Knight	Simplex
Chalmers	Dodge	Jordan	Moore	Standard
Chandler	Dorris	Liberty	Olympian	Stanley
Cleveland	Economy	Locomobile	Packard	Studebaker
Columbia	Elcar	Maibohm	Paige	Texan
Commonwealth	Empire	Marmon	Piedmont	Texas
Crow-Elkhart	Grant	Maxwell	Pierce-Arrow	Velie
				Westcott

TRUCKS

Acason	Concord	Fulton	Kleiber	Selden
Acme	Conestoga	Gabriel	Maccar	Seneca
American La France (Fire Engine)	Clydesdale	Garford	Master	Service
	Dart	Giant	Maxwell	Signal
Armleder	D-E (Day-Elder)	G-M-C	Menominee	Standard
Atco	Dependable	Hahn	Moreland	Sterling
(Amer. Truck & Trailer Co.)	Diamond T	Hall	Mutual	Studebaker
	Dixie	Hendrickson	O-K (Oklahoma)	Sullivan
Atterbury	Dodge	Hewitt-Ludlow	Oneida	Tiffin
Autohorse	Dorris	Hupmobile	Packard	Tower
Available	Fageol	Kalamazoo	Parker	U. S.
Brockway	Federal	Kelly-Springfield	Pierce-Arrow	Velie
Collier	Ford	Kissel Freighter	Rainier	Watson
				Wilcox

TRACTORS

Avery	Dauch	Hart-Parr	Massey-Harris	Parrett
Bailor	Emerson-Brantingham	Illinois Super Drive	Monarch	Samson
Boring	G-O	Indiana	National	Waterloo Boy

AXLES

Timken Peru Liggett Russel Standard Salisbury Torbensen Wisconsin

MOTOR CYCLES

Harley-Davidson Excelsior

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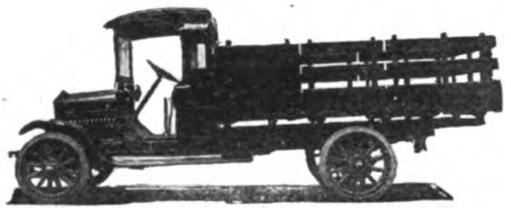
How About The D A Y After ?



Rainier

WORM DRIVE Delivery Trucks

¾ TON—$1750
1 TON—$1875
1½ TON—$2400
2 TON—$2400

ANOTHER Sale—And—Another Profit *Perhaps!*

In the days after you have sold the truck—when it goes through the wear and tear of service on the road—what happens then?

Does it stand the gaff and hold the road—

Or does it come back from time to time—for tightening up (sometimes the day after!) and later on, for the repairs and replacements that reflect on quality?

If it comes back for any kind of service that costs you time and money you are losing part of the profit on the sale!

In the course of a year many an unfortunate dealer has had his entire profit completely wiped out in just this way. Only the truck that "stays put" on the road yields 100% of the initial profit from the sale.

Now we believe that the reason most dealers have found that the Rainier gives such real satisfaction to both buyer and seller is due to two factors:

1. Because the Rainier is built of standard units (the specifications speak for themselves).

2. Because the truck is designed and constructed with the skill accruing from 18 years of experience with automotive engineering on the part of Rainier executives—and there's a long list of Rainier distributors on five continents for whom the Rainier has made good—to prove the correctness of Rainier construction.

Can YOU swing the Rainier Agency?

Real selling ability is the first consideration—preferred even to a large initial order. The territory offered is exceptional—the contract terms most liberal. Write for details.

RAINIER MOTOR CORPORATION
SALES DEPARTMENT
225-227 West 58th Street, New York, N. Y.
Factory—Flushing, Long Island, N. Y.

SPECIFICATIONS

MOTOR—Continental Red Seal in all models

CLUTCH—Brown-Lipe multiple disc

SPRING CONSTRUCTION—Patented double safety shackle on front end of rear springs

TRANSMISSION — Brown-Lipe

REAR AXLE—Timken and Sheldon worm and gear

CARBURETOR—Zenith, with Stewart Vacuum system and Monarch Governor

IGNITION—Simms or Bosch Magneto

WHEELBASE—¾ Ton 125"; 1½ Ton 133"; 2 Ton 147"

LOADING SPACE—¾ Ton 90"; 1½ Ton 9' to 10'; 2 Ton 11' to 12'

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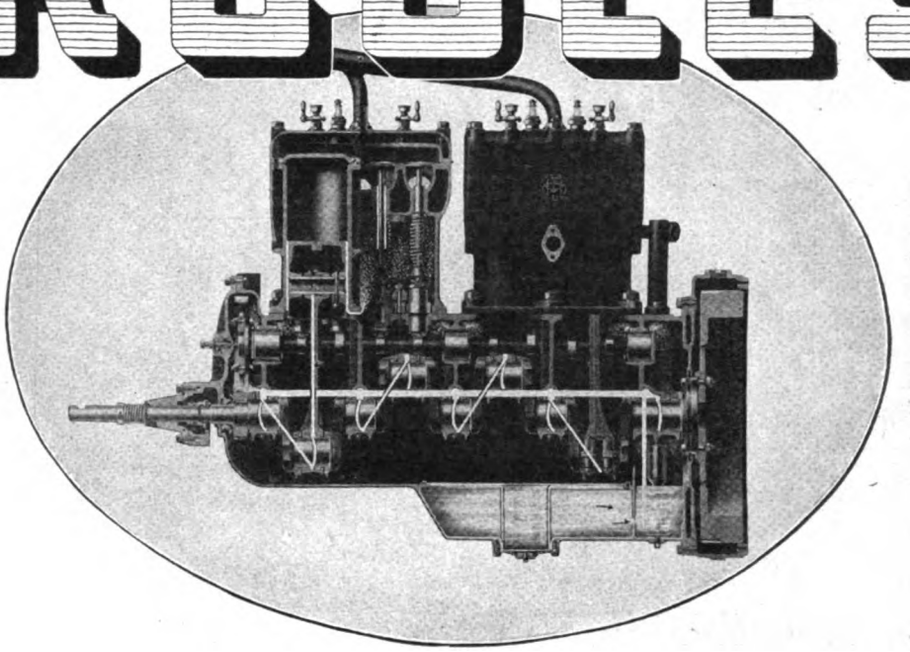
HERCULES

for Trucks and Tractors



The Oil is Forced to Every Bearing!

Because it is the only positive method to lead the lubricant to the points where bearing pressures are greatest.

Because it is the only method to insure that the undesirable heat generated by the friction of each bearing is carried away with the desirable rapidity.

Because it is the only positive method to control and regulate with that degree of accuracy necessary to insure every bearing having its full quota of oil, while positively preventing excessive oil consumption and consequent fouling of spark plugs.

Because the simple oil pressure gauge will at all times give the driver that confidence which can only come when he knows that each bearing is being properly supplied with oil.

In the Hercules design all this is accomplished without the added complications of separate oil pipes and connections by a simple fool-proof system of cast-in tubes and drilled oil ducts.

Remember that faulty lubrication takes its toll in trouble, time and money.

See Hercules at the Chicago and New York Shows

The Hercules Motor Mfg. Company
Canton **Ohio**

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And the wheels?

You must adjust more or less frequently your carburetor, magneto, valves, clutch and brakes. You must tinker with the engine, steering-gear and fan belt. You must remember to turn down grease cups, fill oil reservoirs, pack differential, universals and bearings.

But the WOOD Wheels—do you ever give them any attention?

They never need it—and so they never get it.

During the life of the car or truck other parts may wear out, but WOOD Wheels continue day after day to perform the duty for which they were designed.

This is another reason why WOOD Wheels have been used for years and will continue to be used on the world's best cars.

AUTOMOTIVE WOOD WHEEL MANUFACTURERS' ASSOCIATION
105 West Monroe Street Chicago, Ill.

NOTE THE WOOD WHEELS EVERYWHERE

WOOD WHEELS for MOTOR VEHICLES

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HAWKEYE
MOTOR TRUCKS

Hawkeye Trucks have more *load carrying strength!*
Hawkeye Trucks have more *load moving power!*
There you have the reasons why truck transportation *is* more efficient and economical with the Hawkeye.

We use the best type of internal gear drive rear axle. The load is carried by a *solid forging* of steel which has no other duty than *load carrying*. The load is *moved* by a driving member which does not share the carrying burden.

That is why Hawkeye Trucks have more load-carrying strength and greater load-moving power.

Every unit in Hawkeye Trucks is designed for unusual loads and unusual roads.

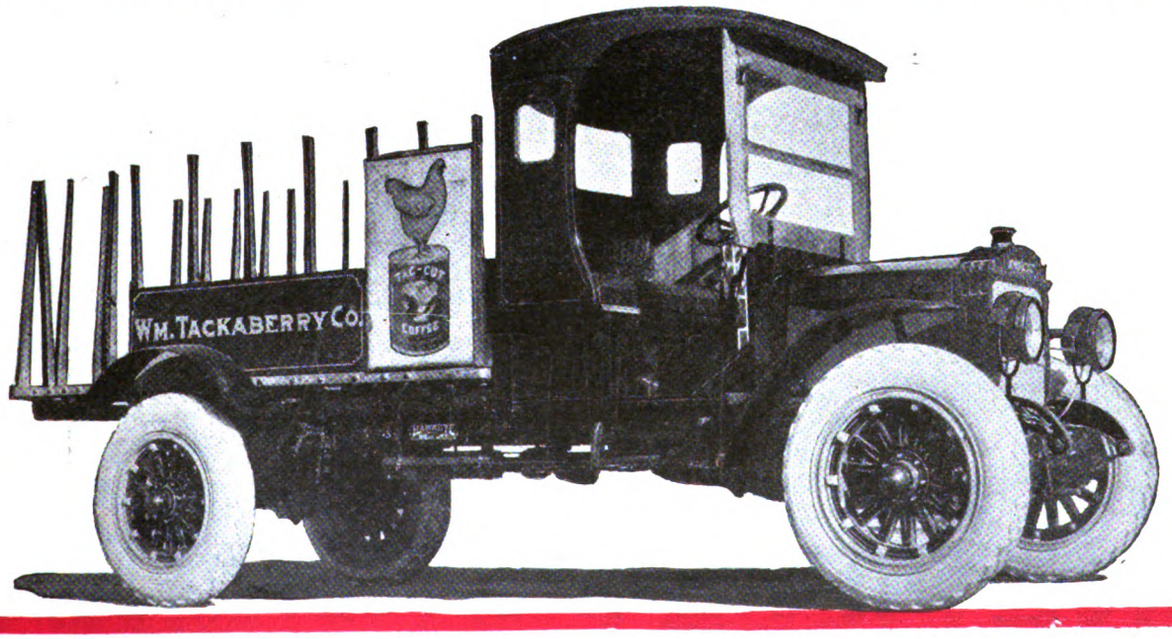
Make Every Road a Right of Way

Mud, sand, hills—they never stop a Hawkeye. Hawkeye Trucks make every road a right of way.

Write for details of our dealer proposition.

HAWKEYE TRUCK COMPANY

R. A. Bennett, President **634 Sixth Street, SIOUX CITY, IOWA**



Please mention "Power Wagon" when writing to advertisers.

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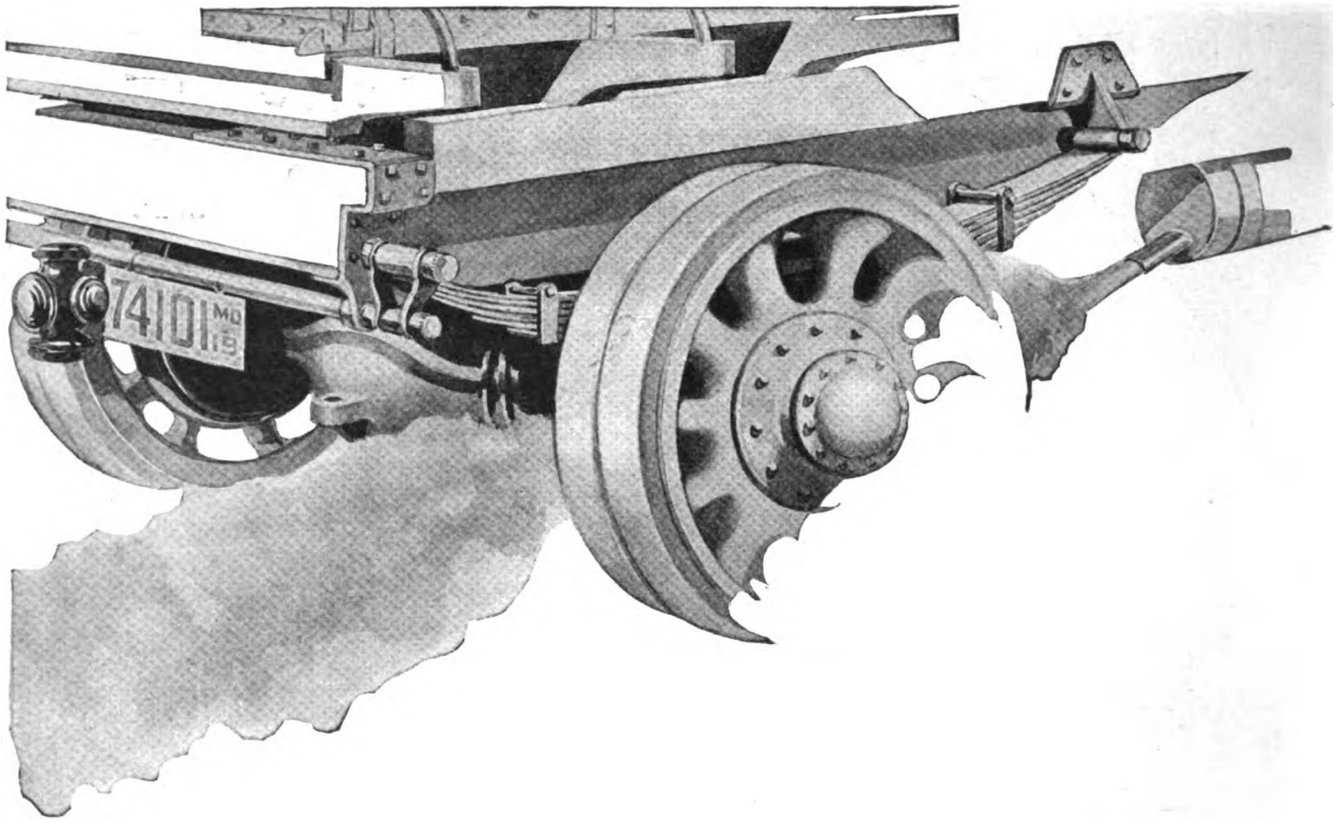


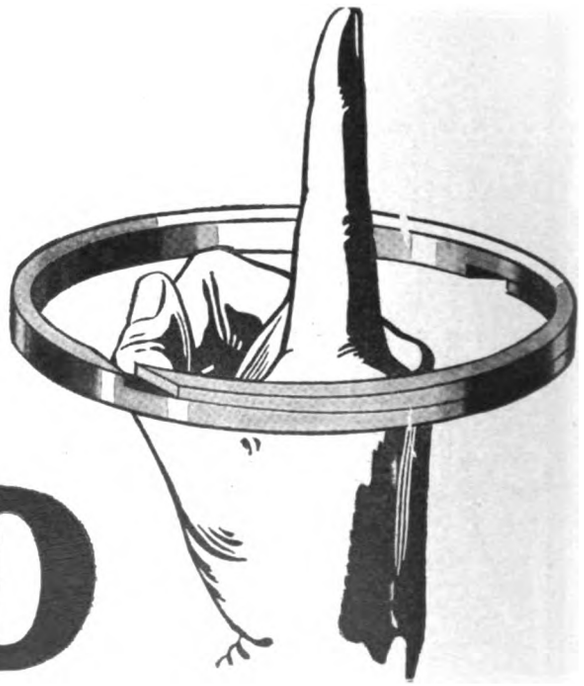
Inlands and the smoke test

A truck equipped with Inland Piston Rings seldom leaves behind it a trail of grayish-blue smoke.
Smoke of this color indicates that oil is getting into the firing chamber and is interfering with combustion.
In order to be proof against leakage of oil, piston rings must fit the cylinder with absolute tightness.
But the ring too must be solid, without gaps at the ends.
The Inland Piston Ring with the spiral cut safeguards against leakage.
Because it is made in one piece and cut spirally, i is gas-tight and oil-tight.
And its tension makes possible a snug fit agains the walls of the cylinder.
Whenever your truck puffs out grayish-blue smoke, look to your piston rings.

Samples on request to dealers, importers, wholesalers and manufacturers.

Inland Machine Works

1650 Locust St. St. Louis, Mo.



INLAND
ONE-PIECE PISTON RING

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ECONOMY

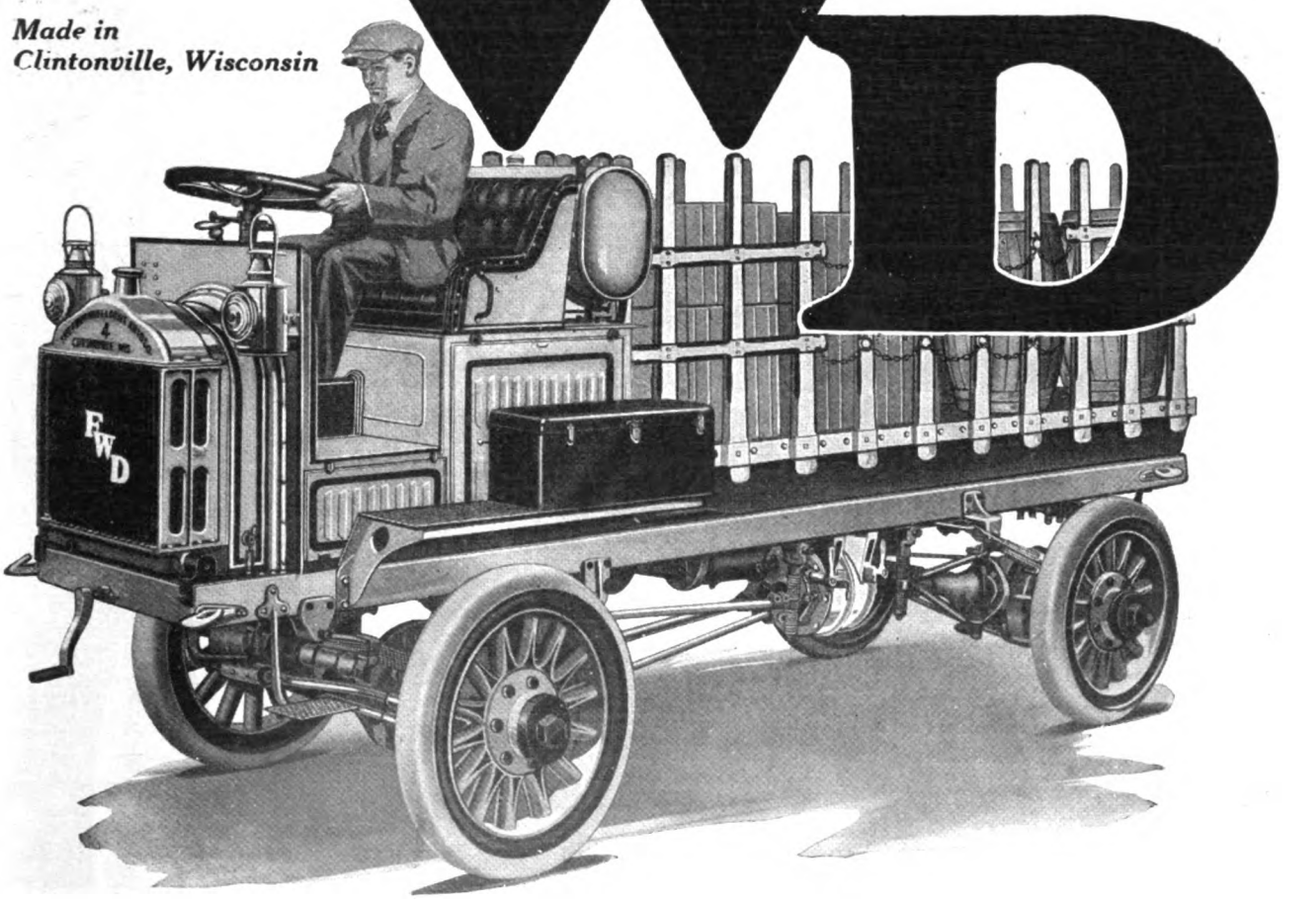
Dominates All Other FWD Features

NOTWITHSTANDING the wonderful performance record made by FWD Trucks in the war, even conceding the popular opinion of greater power and a wider range of operation, due to its ability to negotiate good or bad roads—*still*, the outstanding feature of the FWD is economy. Let us give you all the facts. Write for literature.

FWD

The Four Wheel Drive Auto Co.
Dept. M
Clintonville, Wisconsin
Canadian Factory: Kitchener, Ontario

Made in Clintonville, Wisconsin



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MR MARLIN-ROCKWELL INDUSTRIES MR

The Mark on the Bearing

THE mark on the bearing tells its history—the history of its making and past record and thereby in advance the history of its future performance. When that mark is the S. R. B. Diamond, it means the finality of bearing quality, frictionless operation, dependability, demonstrated in service from the beginning of the automotive industry.

SRB

Single Row Double Row

ANNULAR BALL BEARINGS

Bearings do their work—in the automobile, truck, tractor or other mechanism—hidden away from sight. All the more credit to the manufacturer who installs bearings of S. R. B. quality—all the more reason why you should know the make of bearings in the vehicle or machinery you buy.

From the melting, rolling and annealing in our own steel plant of the High Chrome High Carbon Electric Furnace Steel that is the foundation of S. R. B. strength to the last ten-thousandth inch of accuracy of finish, S. R. B. Bearings are the product of the same organization working to one ideal.

You will find S. R. B. Ball Bearings and S. R. B. Taper Roller Bearings in those motor cars, trucks and tractors whose names are instantly thought of as leaders in their respective fields.

STANDARD STEEL AND BEARINGS INCORPORATED

Philadelphia Standard Roller Bearing Co. Plainville, Conn. Norwich Conn. New Haven, Conn. Pittsburgh Braeburn Steel Co.

Executive Offices: 347 MADISON AVENUE, NEW YORK CITY

Controlled and Operated by

MARLIN-ROCKWELL CORPORATION

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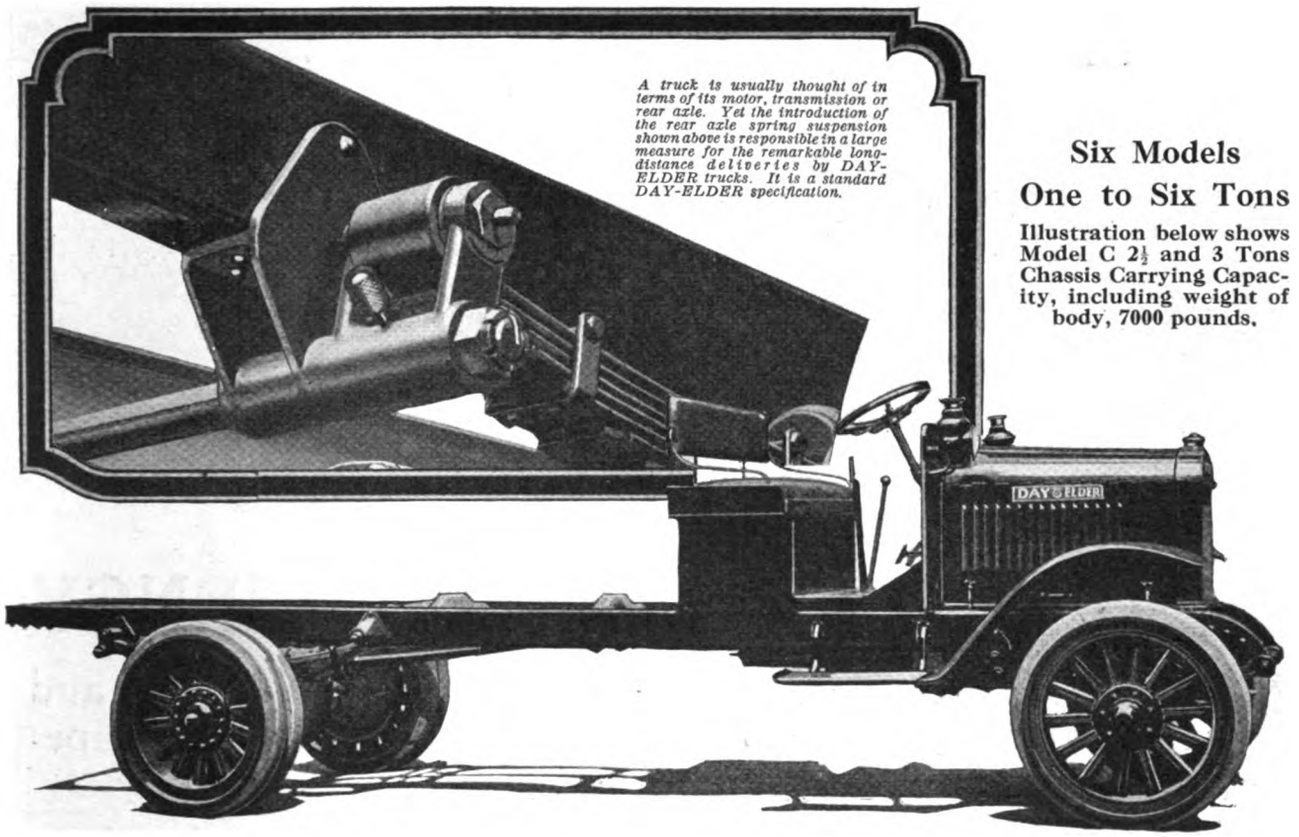

Six Models
One to Six Tons

Illustration below shows Model C 2½ and 3 Tons Chassis Carrying Capacity, including weight of body, 7000 pounds.

Two Big Ideas

Exceptional Quality

When the DAY-ELDER line of six standardized trucks was first conceived, two big ideas were paramount: exceptional **quality** and dominating **value.** We put them in this order, because if the quality of a motor truck is questionable in the slightest degree, its value as an investment is nil.

DAY-ELDER quality and value are fixed, known quantities—dependable and lasting. They constitute the strongest insurance of satisfactory service—at an unusually low cost per ton-mile—that any motor truck user can buy.

Dominating Value

Two impressive pieces of convincing evidence for the two big DAY-ELDER ideas are now available for progressive dealers—"Getting the Facts" and "This Tells You How." A request will bring them to you by return mail. Write for them today.

DAY-ELDER MOTORS CORPORATION

FACTORY, NEWARK, N. J., U. S. A.

Detroit Office: 506 Free Press Building

DAY-ELDER

Worm-Drive Motor Trucks

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THE ELECTRIC STORAGE BATTERY CO.

ELECTRIC TRUCK EFFICIENCY

Wherever the Electric Truck has been "tried out and tested" in actual service on the road, it has proved its superiority for many forms of city and suburban delivery.

Owing to the absence of elaborate mechanism the Electric Truck is very seldom off the road for repairs.

Statistics show that the average "Electric" is in operation two hundred and eighty days out of the possible three hundred per year.

The "Ironclad-Exide" Battery

Is unlike any other storage battery in the world

It is just as different in performance as it is in construction.
It is the 100% battery for Electric Truck Service—the battery that keeps the truck "on the road."

The "Ironclad-Exide"
Is powerful — Has Low Upkeep Cost
Is durable — Is Easy to Maintain
and is assembled in
Guaranteed "Giant" Jars

Address our nearest Sales Office for further information

THE ELECTRIC STORAGE BATTERY CO.
The largest manufacturer of Storage Batteries in the world
1888 PHILADELPHIA, PA. 1920

New York, Cleveland, Boston, Atlanta, Chicago, Pittsburgh, Washington, Minneapolis, Denver, Kansas City, San Francisco, Detroit, St. Louis, Rochester

Special Canadian Representatives—Charles E. Goad Engineering Co., Toronto, Montreal

Batteries are made by this Company for every storage battery purpose

THE ELECTRIC STORAGE BATTERY CO.

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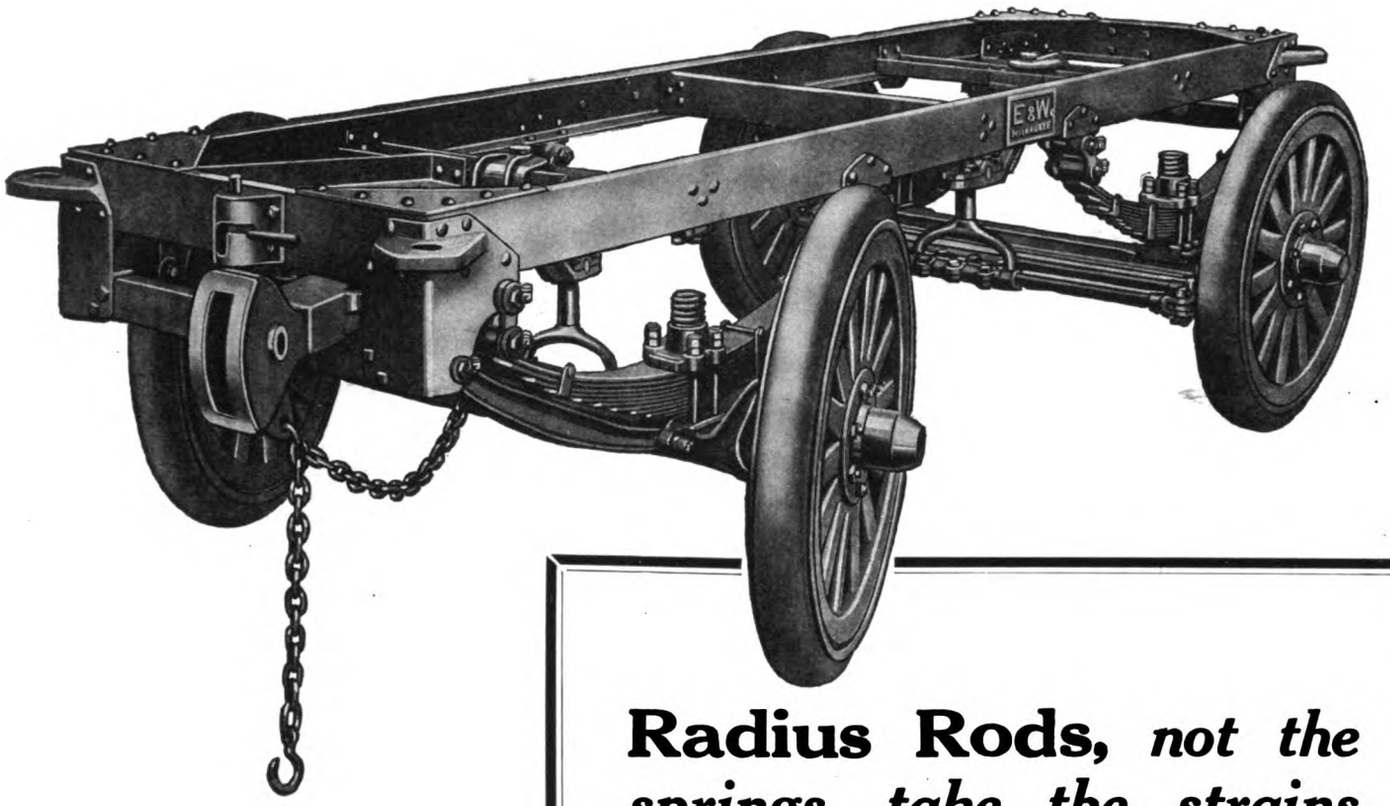

Radius Rods, *not the springs, take the strains*

IT'S the extra heavy Radius Rods in E. & W. Trailers that take the extra heavy strains.

Springs are not overworked or weakened. Relieved by the Radius Rods, they are always free to make an easy-riding cushion for the load.

Easy steering, non-dragging but positive true-tracking are all secured by E. & W. Radius Rods. E. & W. Trailers, because of these features, do not burden your truck. They are built to carry full load at full truck speed without injuring the truck or straining the motor.

Look for the Radius Rods on E. & W. Trailers. They are your guarantee of E. & W. sturdiness and trustworthiness.

COMPLETE DETAILS ON REQUEST

E. & W. Manufacturing Company
MILWAUKEE, WISCONSIN, U. S. A.

E. & W. MILWAUKEE

Dealers:

Get started on this season's business now. Some excellent territory for E. & W. trailers is still available for high class representation. Write for dealer's proposition on your letter head.

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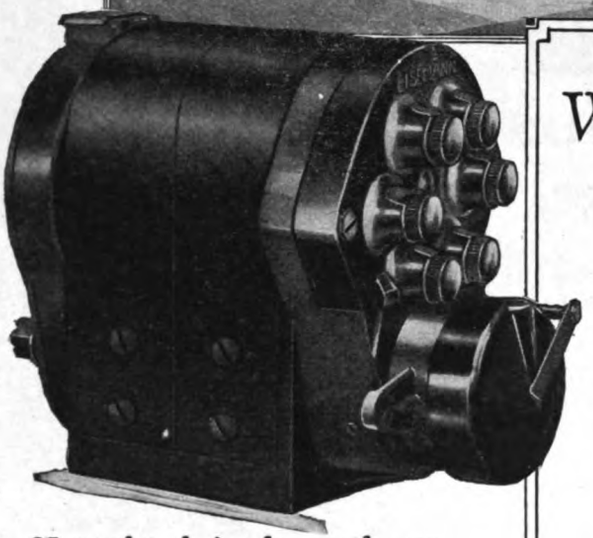
EISEMANN MAGNETO

for Dependability

American La-France Fire Engine equipped with Eisemann GN6



Note the obviously sturdy construction and rugged power. The performance of the Eisemann fully bears out this impression.

When the Alarm Sounds

—there must be no hesitation or faltering. A quick getaway is vitally essential!

The Eisemann-equipped Fire Engine responds instantly to the alarm. A powerful, hot, fat, lingering spark ***is always*** *there when needed.*

For dependability under all conditions and in all temperatures, the Eisemann waterproof and dustproof magneto is the last word in perfect ignition!

THE EISEMANN MAGNETO CORPORATION

Makers of Magnetos for All Types of Internal Combustion Engines

Plant and General Offices—32 Thirty-third St., Brooklyn, N.Y.

CHICAGO—910 S. Michigan Avenue

DETROIT—85 Willis Avenue, West

LONDON, ENG. Stanley J. Watson, 37 Sheen Road, Richmond

Call on us at the Shows:

Chicago Truck Exhibit, Spaces 32-33. Chicago Passenger Car Exhibit, Spaces 8-9-10-11
Also, National Tractor Show, Kansas City

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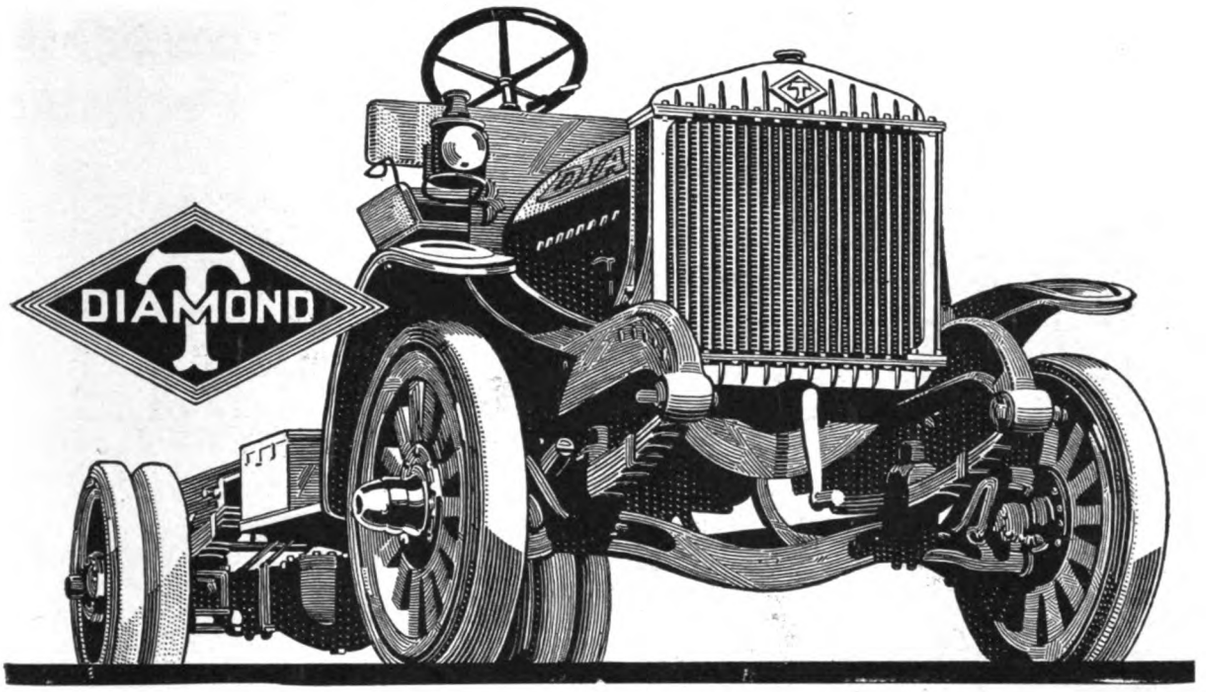

Proof That Proves

The Diamond T Motor Car Company has been continuously successful since 1905. Since 1911, its experience, skill and facilities have been devoted exclusively to the manufacture of high-grade motor trucks.

Only 17 other existing makers can boast a history of truck manufacture that goes back even to 1913.

The very earliest Diamond T trucks are still in use. Their performance records prove everything that we claim — low final cost; dependable year-after-year service; freedom from repairs; uninterrupted service under the most exacting and trying conditions; unvarying efficiency and economy.

Every Diamond T Motor Truck is built to maintain and strengthen an enviable reputation that has been well earned in 15 years of painstaking manufacture.

We are perfectly honest and sincere in asserting that every subsequent model has proven, or will prove, the unusual promises conveyed by the performance of our seven-, eight- and nine-year-old veterans.

Ask for our portfolio entitled "AN OCEAN OF PROOF." It is solid, sincere owner comment on the entire Diamond T line, from 1½ to 5 tons, which meets every requirement of town and country transportation.

DIAMOND T MOTOR CAR COMPANY
4526 W. 26th Street CHICAGO, ILLINOIS

BUILDERS OF

"The Nation's Freight Car"

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Power Performance

Available Trucks

Feature No. 3

Built of Standard Units

Simple, convenient positioning of operating controls in order to lessen driver's fatigue and insure safety when accident threatens is achieved by the Available grouping.

The steering column is placed well to the left, close to the supporting frame, to which it is rigidly attached. It is flanked on each side by the clutch and service brake pedals, separated by a space sufficient to allow both feet on pedals without interference by steering column.

To right and above the brake pedal is the accelerator, convenient for starting, yet high enough not to be reached when feeling for the foot brake. The gear shift lever is squarely in the center-neutral, four forward speeds and reverse being instantly obtainable—while the hand emergency brake lever is within easy reach.

Oil sight feed, choker and lamps are all within the driver's compartment.

Your inquiry will receive prompt attention. Address Dept. F.

AVAILABLE TRUCK COMPANY

Kilpatrick and North Avenues Chicago, Ill.

AVAILABLE ALWAYS SINCE NINETEEN TEN

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DIETZ LAMPS

ONCE LIT
THEY STAY LIT

THE greatest value of Dietz "Champion" Lamps is their reliable performance on the road. Light them when you start. Blow out the light when you return—no blowouts between.

Too often, comment on a motor truck and its equipment runs like this: "It's a good truck, *But*." There is always a *But*.

Dietz "Champion" Lamps take the *But* out of the lighting problem. They overcome one of the chief annoyances of night driving, besides delivering the strongest light possible to secure from kerosene fuel.

Send for Catalog

R. E. DIETZ COMPANY
60 LAIGHT STREET, NEW YORK
FOUNDED 1840

JAMES BARNES, Sales Manager
Motor Truck Lamp Department
CARTER BUILDING, Rochester, New York

DIETZ "CHAMPION" MOTOR TRUCK LAMPS

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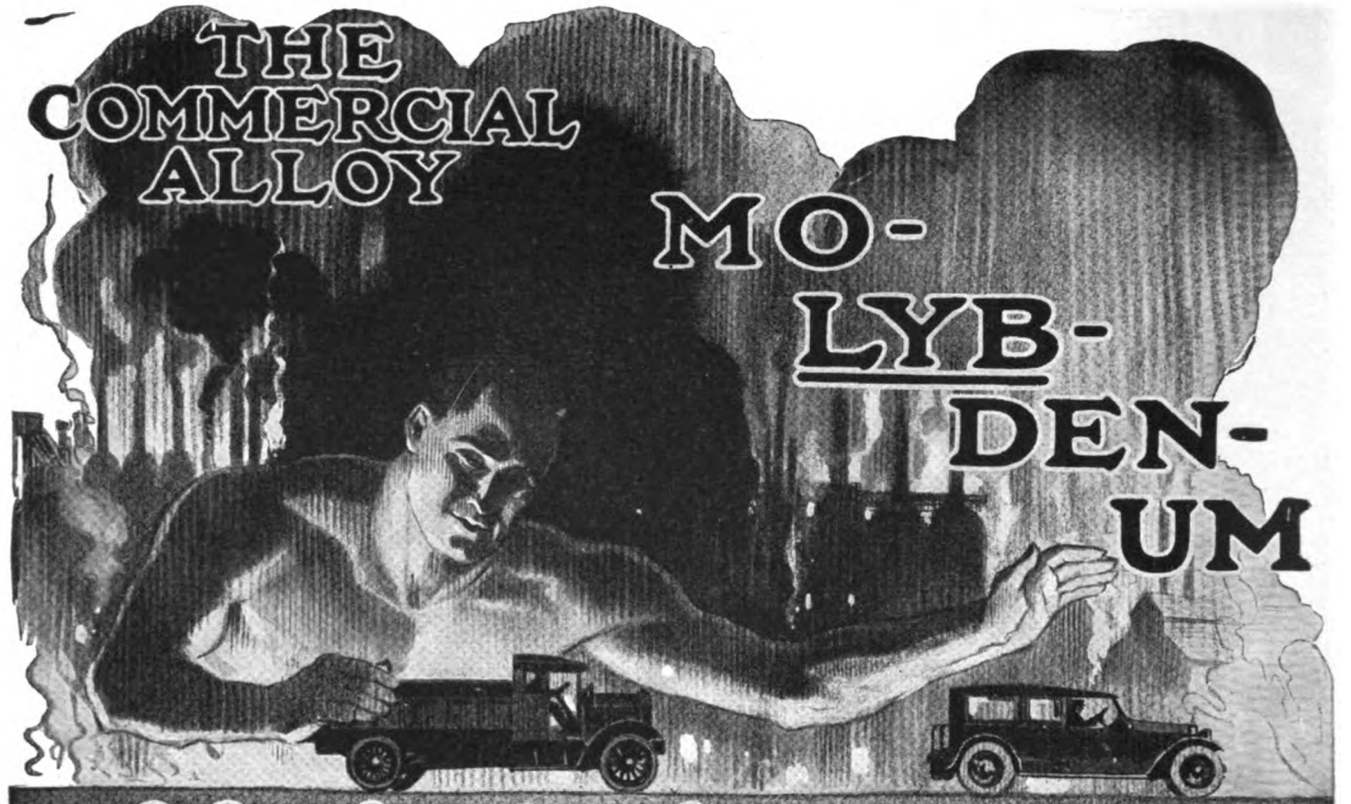

Molybdenum Steels

"Proven in War for the Tasks of Peace"

Stripped of generalities, and confining its statements to results obtained in the actual commercial use of scores of thousands of tons, our book—"Molybdenum Commercial Steels"—just off the press, conveys information of revolutionary import to metallurgists and alloy steel manufacturers.

The metallurgy of these steels was not known until the development resulting from the war-time call for tougher, stronger alloy steels, which could still be handled on a basis of competitive economy, brought about the selection of Molybdenum for work of unusual severity. The **results, so eminently and uniformly satisfactory under the exceptional stresses of war, are now placed for the first time within easy reach to meet the necessities of peace.**

Mo-lyb-den-um

Copies of the book may be had by addressing

Climax Molybdenum Company—or—The American Metal Company Ltd.
61 Broadway ——————— New York

Climax Molybdenum Company is the Largest Producer of Molybdenum in the World

Proven in War for the Tasks of Peace

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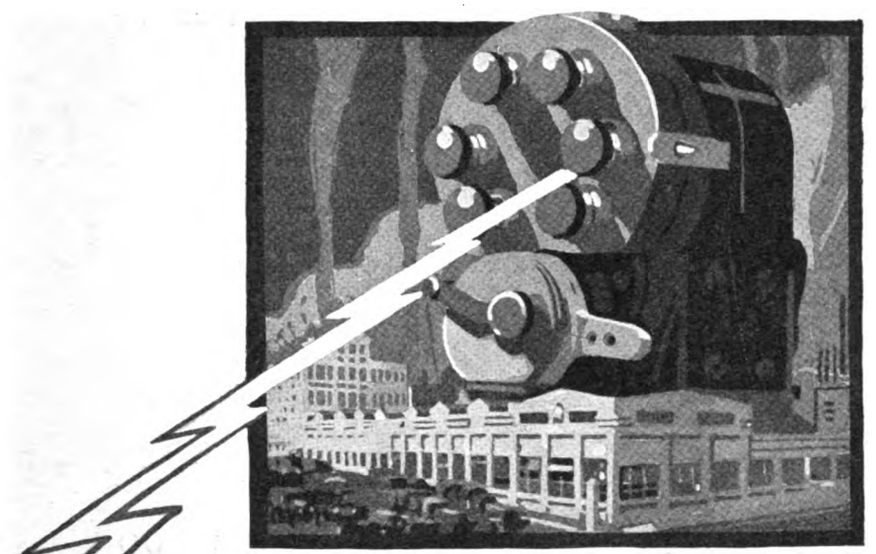
BOSCH



3,000,000

Three Million Proofs of Bosch Supremacy

THE Three Millionth Bosch Magneto has been made and sold—an achievement which demonstrates anew the remarkable popularity of Bosch Magneto Ignition.

No other ignition system has a history so brilliant as that of Bosch—so replete with records made and honors won. But its greatest fame lies in its long record of dependable and efficient service, year after year, on engines everywhere.

That's why the demand for Bosch—the Quality Ignition System — mounts steadily, even though the output of the factory is now four times greater than before the war.

Dealers find Bosch Ignition doubly va'uable, for it not only makes their products more dependable, but makes them easier to sell.

Be Satisfied — Specify Bosch

American Bosch Magneto Corporation

Main Office and Works: Springfield, Mass.

Branches: New York Chicago Detroit San Francisco

AMERICA'S SUPREME IGNITION SYSTEM

Motor Trucks—Tractors—Airplanes—Motor Cars—Motor Boats—Motorcycles—Gas Engines—Etc.

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Place Your Order Now

POWER WAGON REFERENCE BOOK for 1920

1920 issue of Power Wagon Reference Book will be out of press early in February

There is a very heavy advance subscription —so large that it will be necessary to fill orders in rotation of their receipt.

If you expect early delivery of your copy you must place your order immediately.

Price, including a year's subscription to Power Wagon, $5.00, in advance.

ORDER NOW

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Commerce TRUCKS

Ten Years *of* Progress In Truck Efficiency—

THAT is the manufacturing record behind Commerce Trucks.

Each year a better Commerce—a speedier—more efficient—more reliable vehicle.

Each year a Commerce that increasing numbers of truck users put their stamp of approval upon, until today Commerce is the largest exclusive builders of one to two ton trucks in the world.

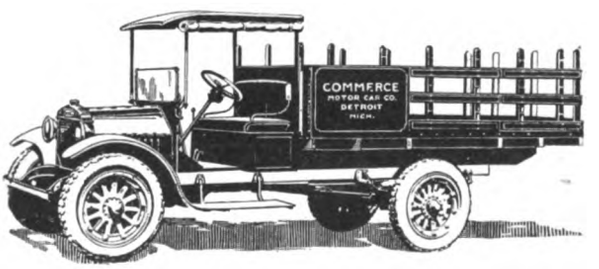
The Commerce Motor Car Company intends to spread its product over a wide range of territory in 1920. Our policy is to have Commerce motor trucks in Nation Wide Territory instead of concentrating in Trade Centers.

It is not a question of The Commerce Motor Car Company being able to merchandise its product in 1920. It is just a question—if you are a good enough business man to make money—for you to investigate the Commerce Truck and the Commerce Franchise for your territory.

Commerce Dealers Must Make Money

THE COMMERCE MOTOR CAR CO., Detroit, Mich.

Largest Exclusive Manufacturers of 1 and 2 Ton Trucks



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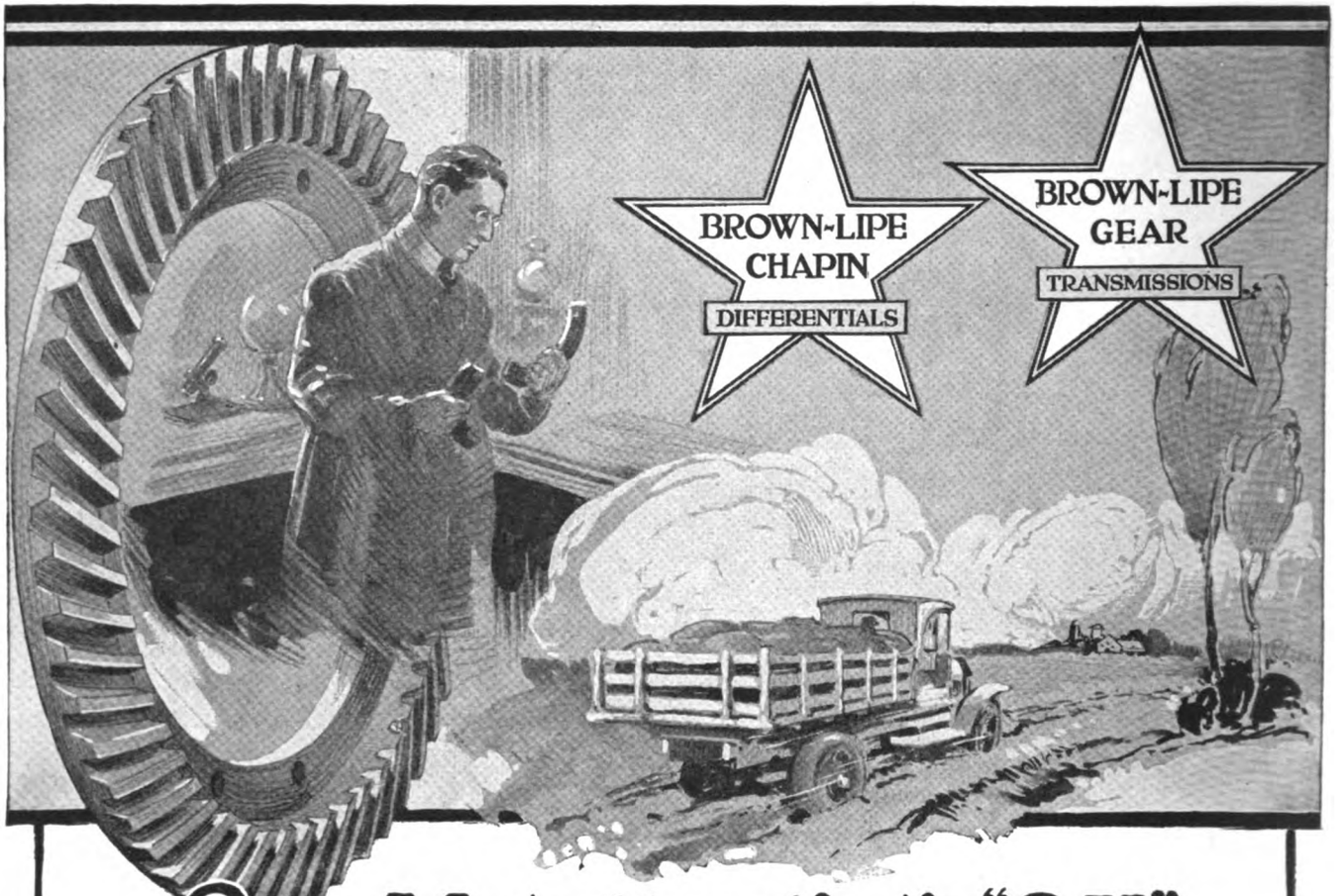

Our Metallurgist's "O.K." is Your Protection

So that the car or truck buyer may take pride in his car's stamina—endurance—great strength, Brown-Lipe Metallurgists stand as ever watchful sentinels at the steel mills—the drop-forging plants—at every source of raw or semi-finished material.

When the Metallurgist's "O. K." finally releases material for production, assurance has been made "doubly sure" that it is of the special quality for the purpose.

The fact that a car or truck contains Brown-Lipe Transmissions or Brown-Lipe-Chapin Differentials is evidence that the vehicle manufacturer has done his utmost to relieve the buyer from any future trouble with the two vital spots in the car's anatomy.

BROWN-LIPE-CHAPIN CO.
DIFFERENTIALS

BROWN-LIPE GEAR CO.
TRANSMISSIONS

Both at **SYRACUSE, N. Y.**

No. 1 of 40 Reasons for Superiority

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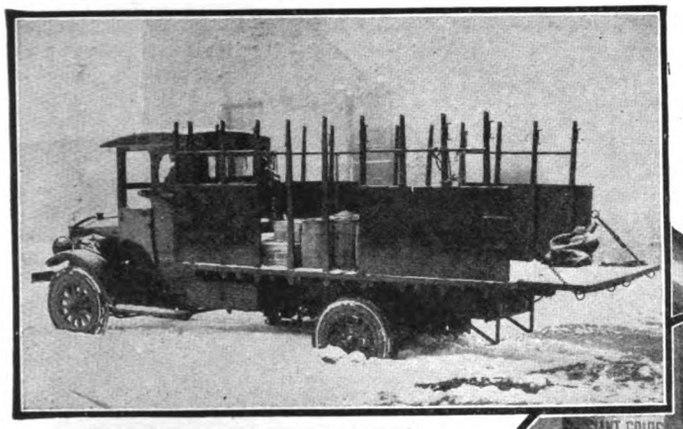

Plenty of power but no grip on the road

For Snow-Bound Trucks Giant Grips Open the Road

The driver put on Giant Grip chains and the truck pulled through

TRUCKS "laid up" by icy roads and heavy snows are a liability. But owners and operators are making them pay, in the worst weather, by equipping with Giant Grip Traction Equipment.

Advertising is creating a demand for "Giant Grip" which you can profitably fill in your locality. There is no simpler or stronger traction equipment on the market, or none that is easier or more satisfactory to sell.

Clamps are permanently attached to the wheels, and the chains and hooks carried in the tool box until needed. At a stretch of "bad-going" the driver hooks on the chains with his bare hands. No tools—no jacking up the wheels. Two minutes and the truck is on its way.

A size of "Giant Grips" fits every truck, yet fewer sizes for the dealer to carry than in any other line. This means small stock and quick turnover.

Write today for our attractive dealer proposition. Dept. 25

CHALLONER COMPANY Established 1863 Oshkosh, Wis.

Giant Grip

Traction Equipment for Motor Trucks

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AUTOMOTIVE TRAILER

"THE FREIGHT CAR OF THE HIGHWAY"

BUILT TO QUALIFY

AUTOMOTIVE ATC TRAILER

DISTINCTIVE FEATURES

Roller Bearing Turntable—Steel Wheels—Oilless Bushing
Standardized Construction

To the dealer of motor trucks who has made a study of commercial hauling conditions, the advantage of having exclusive selling rights on a complete line of Trailers is evident. We offer to the distributor a very interesting co-operative sales plan. Full information on our product and selling plans will be given on request.

COMPLETE LINE

4 Wheel — Semi — Pole — 2 Wheel

1 to 15 ton Capacity

AUTOMOTIVE TRAILER CORPORATION

GENERAL OFFICES
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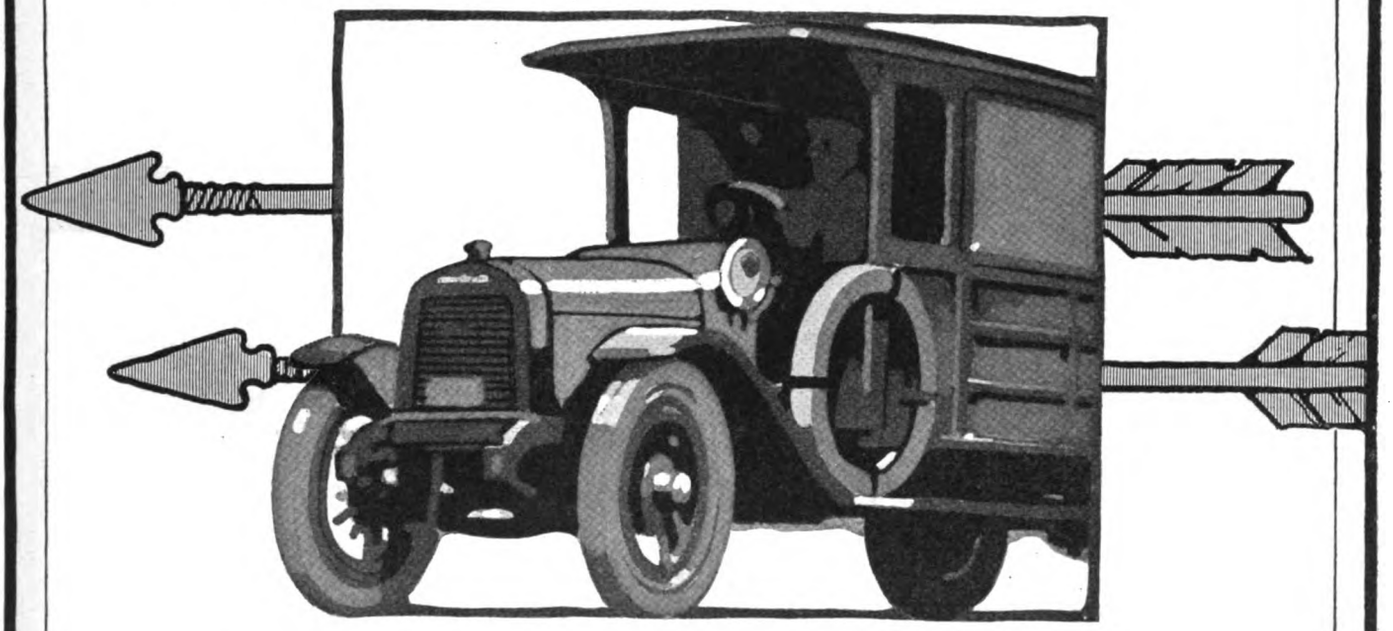
Swift & Sure!



3/4 ton BETHLEHEM DEPENDABLE DELIVERY

The Fastest Selling Truck in the Biggest Truck Market

This newest Bethlehem Truck completes a line which covers the Truck Market most profitably. It adds to a Bethlehem Dealer's List of Prospects—every butcher, baker, grocer, farmer or dry goods store. Anyone who has anything to deliver swiftly and surely is a logical buyer of a ¾ ton Bethlehem.

Someone in your territory is going to dominate the motor truck selling field. Someone is going to put the business building forces behind the Bethlehem Franchise to work. Someone is going to represent Bethlehem. *Are you the man?*

$1495 Chassis

¾ Ton Chassis
1½ Ton Chassis
2½ Ton Chassis
3½ Ton Chassis

BETHLEHEM MOTORS CORPORATION
Allentown Pennsylvania

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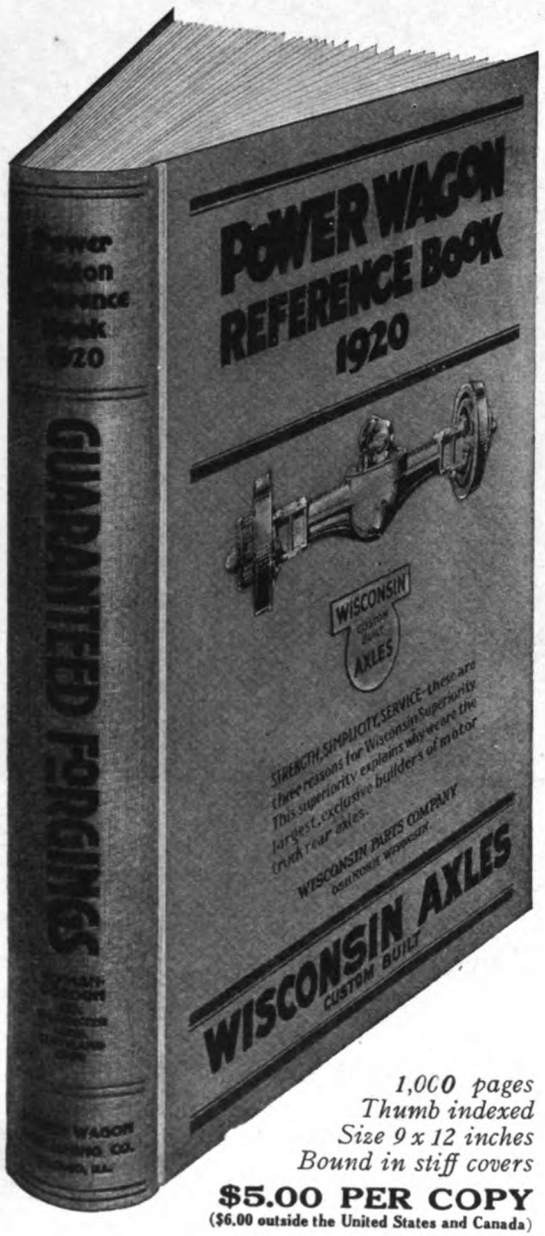

1,000 pages
Thumb indexed
Size 9 x 12 inches
Bound in stiff covers

$5.00 PER COPY
($6.00 outside the United States and Canada)

Features of the Book

The 1920 edition of the "Reference Book" will contain 92 full pages (9x12 inches) of specifications of motor trucks, trailers, farm tractors, and passenger cars. There will be approximately 134 pages of blue prints of these models, showing plan and elevation views. The 500 pages of text, in addition to the above, will afford a vast volume and great range of information to all who are interested in the production, sale or application of trucks, trailers and farm tractors.

The "POWER WAGON REFERENCE BOOK" for 1920 will be the most useful piece of trade literature ever printed. Its purpose is to supply the vital facts of the industry and, through their presentation, expand the market.

Subscription Payable in Advance

A Wonderful Book for "Fleet Owners" and Transportation Managers

THE "POWER WAGON REFERENCE BOOK" is consulted with great frequency by the transportation executives of the biggest firms in the country. They are greatly benefited and stimulated by its contents. Here are a few of the concerns which use it:

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Waterbury Sand & Gravel Co.
Standard Oil Company
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Star Motor Delivery Co.
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Texas Company

The "POWER WAGON REFERENCE BOOK", after only one year's circulation, has taken first rank among the text books of the industry. Every "live" transportation manager should have a copy of this remarkable book. The

POWER WAGON REFERENCE BOOK FOR 1920

will contain about 1,000 pages, three-quarters of which is devoted to comprehensive studies of every feature of automotive design and equipment. In addition it presents 42 detailed studies of the application of motor trucks in as many branches of industry.

The "POWER WAGON REFERENCE BOOK" is invaluable as "a buyer's guide," for it not only describes and illustrates all models, but it also gives complete information pertaining to their equipment—bodies, hoists, etc. When the buyer of motor trucks is familiar with the contents of the "POWER WAGON REFERENCE BOOK," he is practically on even terms with the seller.

The 1920 Book Will Be Ready Early in February

Order now—today, if possible—and save yourself the disappointment of not being able speedily to secure a copy at a time when we are hard pressed to make deliveries. Orders will be filled in rotation as they are received.

The Price is $5.00---Payable in Advance

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POWER WAGON PUBLISHING CO.
544 Lake Shore Drive Chicago, Ill., U. S. A.

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Ease of Control

It is in heavy traffic where constant shifting of gears is necessary that one fully realizes the part the transmission plays in the motor truck or motor car.

Trucks and cars equipped with Covert Transmissions have little difficulty in heavy traffic.

Especially is this true of motor trucks.

Covert Transmissions are designed to make shifting of gears easier as well as to transmit a constant flow of power to the rear axle.

Covert Gear Company, Inc.
Sales and Engineering
967 Woodward Avenue, Detroit, Michigan
Factory: Lockport, N. Y.
Export Office: 100 Broad Street, New York

"There is No Weak Point in a Covert"

COVERT TRANSMISSIONS

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The excellence of Wolverine Trucks makes it possible for us to offer dealers a generous factory guarantee

Detroit, Mich., Nov. 15, 1919.

AMERICAN COMMERCIAL CAR CO.,
Detroit, Michigan

Gentlemen:—Your recent inquiry as to how we like the Wolverine Truck, should have received its answer from the fact that we purchased two of them this year. We surely would not have acquired the second if the first had failed to stand the gaff.

However, for your benefit, we will carry a little coal to Newcastle by stating that our two Wolverines are certainly holding up their end in demonstrating the three virtues that make a truck an invaluable aid in holding down existing high operative costs—efficiency, economy and dependency. In the expressive vernacular of the street, the Wolverine is unquestionably a peach.

CHAMPION BEVERAGE COMPANY,
F. Schmidt, Pres.

You have only to read what every operator of a "Wolverine" says to know that the standard units of which it is built are assembled into the finished truck in the most expert way.

Every truck that leaves our shipping dock is a perfect piece of rugged construction built to stand up under all conditions.

We have openings for a few progressive Distributors and Dealers.

If you are looking for a truck built of the best units of over-size strength that sells easily at a moderate price—and stays sold—you will be interested in getting Wolverine prices, discounts, terms and guarantee.

If we are not represented in your territory write or wire us.

American Commercial Car Co.
DETROIT, MICHIGAN

February, 1920

EVERY DAY
MOTOR TRUCK CAB

The day will soon be here when every truck will be equipped with a closed cab. Why? A closed Cab protects the driver in all kinds of weather and enables him to work at maximum efficiency all the time.

This insures full time for the truck and low cost of upkeep which spells truck efficiency.

The Perfect Cab for All Seasons

The EVERYDAY cab is quickly convertible to the needs of the season—completely closed for winter, semi-closed for changeable weather, and open in hot weather.

It is a **Highland** product, conforming to the same high standards of design, adaptability, material, and workmanship as the **Highland** standard bodies.

Specify the **Highland** EVERYDAY cab on all your trucks.

The Highland Body Manufacturing Company
1114 Elmwood Place CINCINNATI, OHIO
Detroit Branch: Holden and Greenwood Avenues

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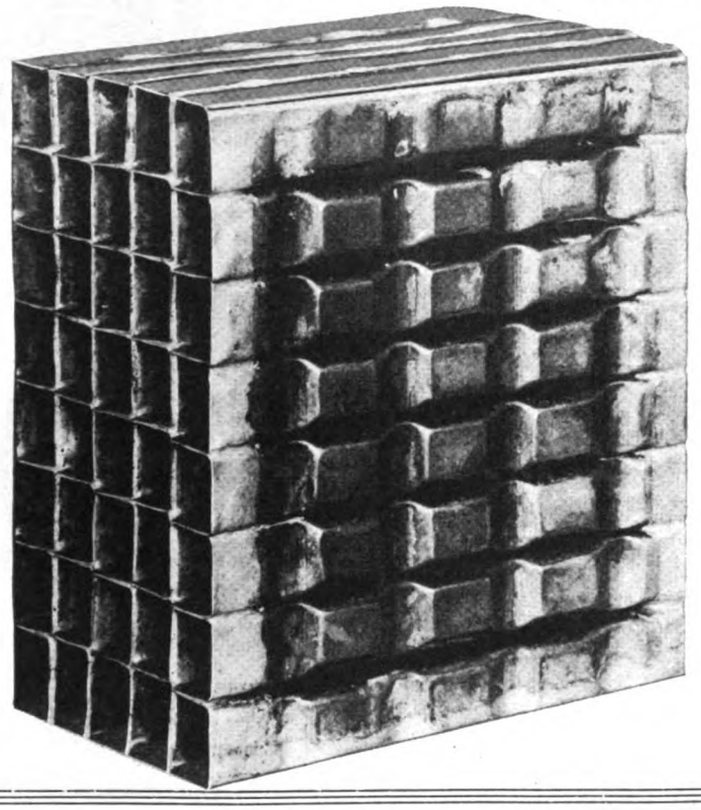
THE K. & L. EFFICIENT RADIATOR



THE K. & L. radiator is of new type construction involving a combination of tubular and cellular core which allows for lateral as well as perpendicular expansion—a feature peculiar to no other radiator and one which gives greatest assurance against leaks due to changes of temperature.

The cores are constructed to withstand continuous vibration and heavy shock. They are made of 34, 35, 36 gauge brass in honeycomb effect in all sizes for pleasure cars, trucks, and tractors.

We are glad to co-operate with your engineering department in solving your radiation problems.

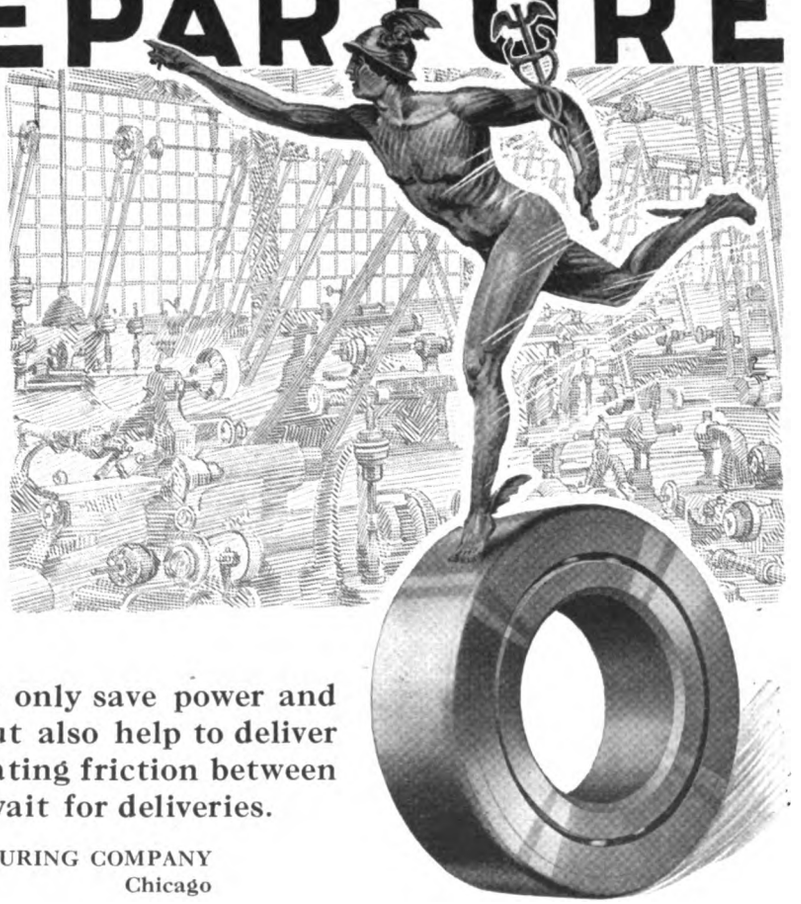
Send us blue prints and specifications.

We can make prompt deliveries.

K. & L. Radiator Manufacturing Company

215-17 W. 31st Street, Chicago

NEW DEPARTURE



INCREASED production of motor cars must make up for great shortage of men and hours.

Far-sighted manufacturers are already outstripping competitors by refining and improving their machinery. New Departure Ball Bearings are enabling them to speed up machines without increasing the power to turn them! Power that once was wasted in the frictional drag of moving parts is saved and being utilized to turn out more work.

So it is that new departures not only save power and lessen wear in your motor cars, but also help to deliver them to you more rapidly—eliminating friction between yourself and those who anxiously wait for deliveries.

THE NEW DEPARTURE MANUFACTURING COMPANY

492-A Detroit BRISTOL, CONN. Chicago

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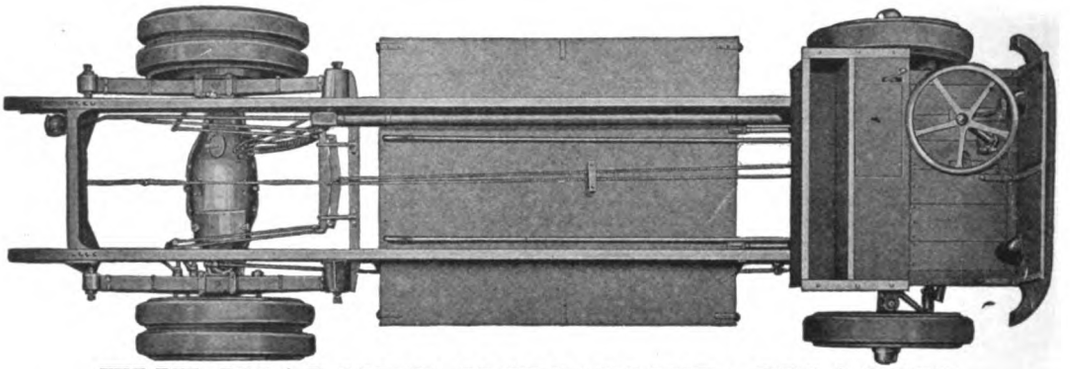
WALKER ELECTRIC TRUCKS



THE WALKER IMPROVED CHASSIS

THE UTMOST IN *SIMPLICITY*—ONE THOUSAND FEWER PARTS THAN ANY GASOLINE CHASSIS.
WALKER ELECTRIC CHASSIS ARE OPERATING *PROFITABLY* IN ALL INDUSTRIES.

ASK ANY WALKER USER, BRANCH OR DEALER

WALKER VEHICLE COMPANY

America's Leading Manufacturer of Electric Trucks and Tractors

NEW YORK CHICAGO BOSTON

LOWEST-TRUCKING-COST

Pressed Steel Frames

The largest and best equipped Frame plant in the world

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The Advantage to Dealers of 20 Years' Experience

The Gramm-Bernstein dealer does not have to waste time in the slow, tortuous process of disarming sales resistance.

He does not have to submit comparisons of price or comparisons of merit.

The Gramm-Bernstein line includes certain exclusive and basic advantages of construction, any one of which justifies its price.

Taken altogether, they set Gramm-Bernstein quite apart from comparison or competition.

The reputation of B. A. Gramm for initiative and constructive improvement in motor transportation dates back twenty years.

His inventive genius is responsible for basic improvements that have long been accepted standards of the industry.

The very last and highest developments of his unique engineering experience are presented in the Gramm-Bernstein truck.

Years of better performance and better service are the biggest selling factors in the Gramm-Bernstein. This is established by the extraordinary percentage of re-orders.

Let us show you how Gramm-Bernstein prestige is continually helping its dealers to easier and more profitable sales.

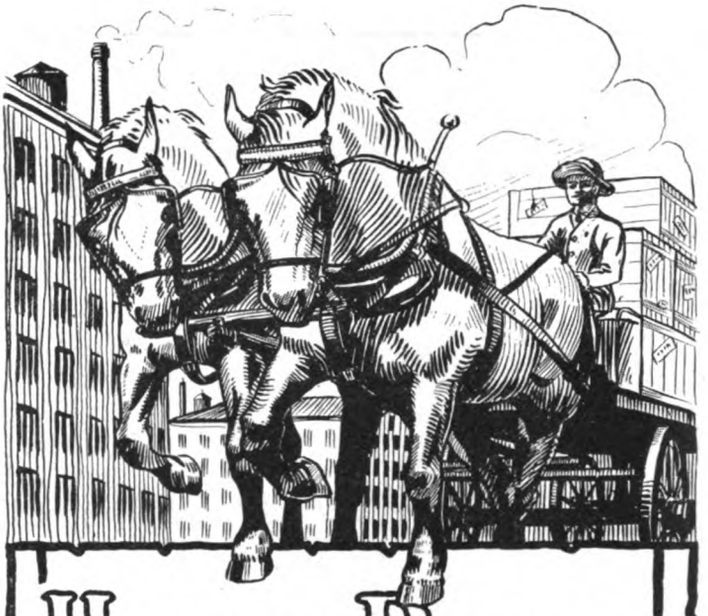
Gramm-Bernstein Worm-Drive Trucks in 1½, 2, 2½, 3½ and 5-ton capacities, are now sold completely equipped, ready for the body—not an extra to buy.

All Gramm-Bernstein Transmissions are provided with a pad for attaching Gramm's Basic Power Take-off. Dealers and truck owners should assure themselves that any trucks purchased with power take-off do not infringe B. A. Gramm's Basic Patent No. 1194994

The Gramm-Bernstein Motor Truck Co.

Pioneers Since 1901—Builders of the First Liberty (U. S. A.) Truck

Lima, Ohio, U. S. A.



Horse Power

As the horse's vitality depended upon the care and feed given it, so the motor's efficiency depends upon the gasoline and oil fed to it.

Dust and dirt in an oil has a tendency to form a sticky gum which grinds the cylinders as well as causes carbon.

Gasoline that is exposed to the air becomes stale and lifeless. It loses its "pep."

BOWSER STORAGE SYSTEMS

keep the life in gasoline and oil. There is no evaporation of vitality from the gasoline, no dirt getting into the oil.

Write today for Bowser literature which explains. Sent without obligation to you.

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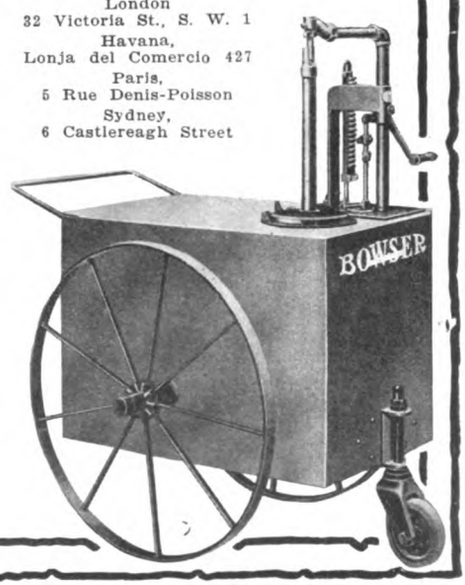

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REYNOLDS

MOTOR TRUCKS

Will be exhibited at the Detroit Automobile and Truck Show, February 14th to 21st. This will be the most *accessible* and *largest* show of the year.

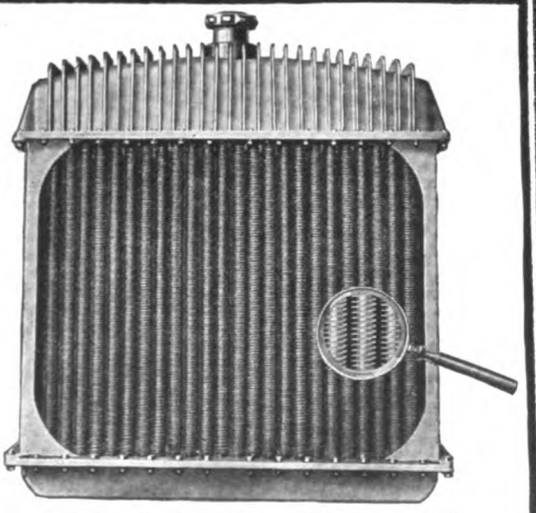
1½-2½-3½ and 5 ton capacities
4 ton Inter-City Express Type
mounted on pneumatic tires.

Desirable territory is open to responsible distributors

REYNOLDS MOTOR TRUCK COMPANY

MT. CLEMENS, MICHIGAN

RADIATOR INSURANCE



GUARANTEED FOR THE LIFE OF THE TRUCK

These Seamless Helical Tube Cooling Sections are perpetual insurance against radiator trouble.

Write for complete information

Rome-Turney Radiator Co.
Rome, New York, U. S. A.

TRUCK TIRES

Write if Interested!

Splendid selection of factory-blemished and surplus stocks from the better Akron factories

The Rubber City Clearing House Co.
AKRON, OHIO.

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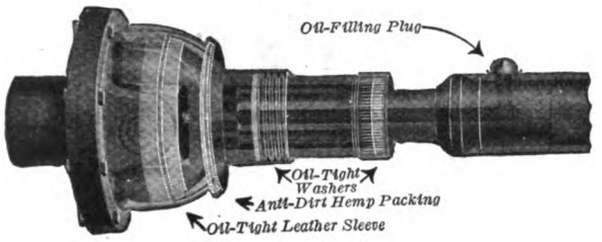
"M&E" Universal Joint

(Pat. and Pat. Pend.)



THIS joint embodies the best points devised by Automotive Engineers for the War—U. S. and Allied program.

Severe variable speed tests in all temperatures, up to 175° + were made without change or loss of oil, or injury to the leather sleeve.

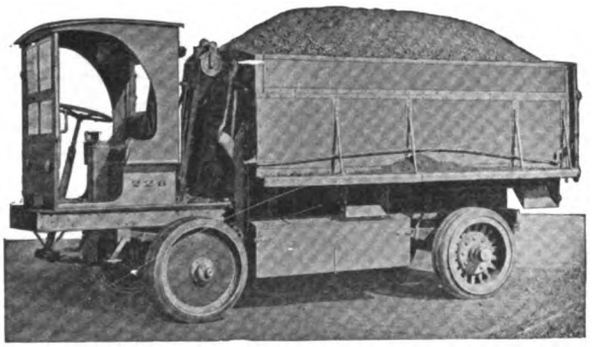
This joint is simple, very strong and has ample bearing surfaces.

We will continue to make our present grease lubricated Joints but by inserting a special sleeve, the Joint can be made to retain oil.

The new "M&E" Dry Disc Clutch is a dependable unit that efficiently transmits the full power from the motor.

MERCHANT & EVANS Co

NEW YORK PHILADELPHIA WHEELING
BALTIMORE CHICAGO
ATLANTA ST. LOUIS
CLEVELAND KANSAS CITY
DETROIT



Front or Four-Wheel Drive Trucks and Tractors

Conservation is the key to success. ***Couple-Gear*** is the method, saves men and horses. Derives its propelling force from water flowage. The ***best*** is the ***cheapest.***

Your inquiries are solicited

Couple-Gear Freight-Wheel Co.

1550 Buchanan Ave., GRAND RAPIDS, MICH.

Couple-Gear Power Truck Co.
Peoples Gas Building, Chicago, Ill.

Couple-Gear Electric Truck Co.
179 W. First St., S. Boston, Mass.

LEE LINE

Trailers—Bodies—Loaders

Automatic Side Dump Bodies

Choice between side and end dump motor truck body perhaps cannot be reduced to a mathematical formula, but, nevertheless, is based upon desired results under given conditions.

Most contractors find the automatic side dump body especially suited to their needs. Maneuvering on a crowded street, generally between piles of brick, lumber, stone and other construction material, the advantage of dumping a load off the side, clear of the roadway, is apparent.

The easy rolling motion of the side dump body permits dumping cement, brick, and other semi-fragile materials with little danger of breakage.

Size dump bodies are built in one, two, three and four sections. Single section also provided with end gate for lumber and merchandise hauling.

If it is a Trailer, Semi-Trailer, Motor Truck or Trailer Body or special handling or hauling equipment—we make it.

LEE LOADER & BODY CO.

Builders of Automotive Auxiliary Equipment

23 So. La Salle St. Chicago

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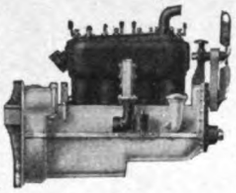
Lower Price?-No! Less Cost? Yes!

WISCONSIN Motors appeal to the man who can see beyond the price tag. The price is higher on account of superior workmanship—adjustments, running in, testing, inspections. But you save in the end because the motor is *finished*.

Your mechanics don't waste time adjusting

Crank Shaft
Made of high chrome nickel steel, sand blasted and double heat treated. All bearings ground accurately to size. Flywheel flange forged integral with the crank shaft.

Wisconsin CONSISTENT **Motors**



This motor was adopted as government standard for the Four Wheel Drive, Militor and 1½ ton Garford Trucks—fifteen thousand were used.

Write for specifications.

Wisconsin Motor Mfg. Co.
Station A, Dept. 313 Milwaukee, Wis.

Distributors:
New York Branch: T. M. Fenner, Factory Rep., 21 Park Row
California Distributor: Earl P. Cooper & Co., Los Angeles, Cal.
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GRANT TRUCKS

One-and-a-half and Two-tons

Complete Equipment—Electric Starting and Lighting

Write for interesting dealer proposition

GRANT MOTOR TRUCK CORPORATION
CLEVELAND

Truck Manufacturer

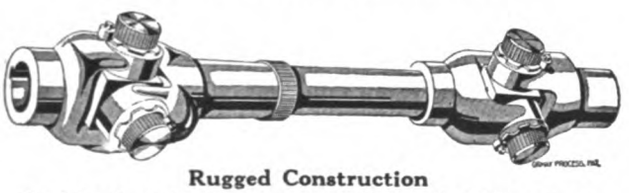
Are you interested in

Prompt Deliveries

of

Universal Joints

A standard product made in six sizes to meet all truck requirements



Rugged Construction
Positive Lubrication **"Oversize" Bearings**

Blood Bros. Machine Co.

Pioneer Makers of Universal Joints
Allegan **Michigan**

The Power Wagon Reference Book Contains—

THE most elaborate specifications of motor trucks, trailers and farm tractors ever published are presented in 92 pages. Blue print plan and elevation views of the principal models of trucks, trailers and tractors are shown in 134 pages, printed in color. The 500 pages of text matter afford a vast volume and great range of information to all who are interested in the production, sale and application of trucks, trailers and tractors. For the technical man there is technical data. For the reader not so keen for technical information there is a great mass of enlightening text matter, which will enable him to trace the economy of trucks, tractors and trailers. A particularly valuable feature of the book is the section which presents 42 detailed studies of the application of motor trucks in as many industrial services. The tables supplied in connection with these 42 studies of motor truck application present the most valuable, painstaking and accurate analyses of market ever presented to the trade.

***Order Now*—Price including a years subscription to Power Wagon $5.00 in advance.**

THE POWER WAGON PUBLISHING CO.
544 Lake Shore Drive
CHICAGO

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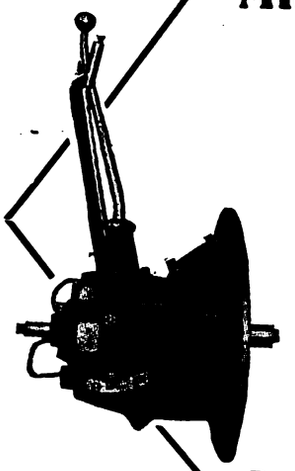
DURSTON
TRANS-MISSIONS



Designed by Engineers of long experience and built in a modern plant by careful workmen under a rigid inspection system.

DURSTON Transmissions fulfill every requirement — they have stood the supreme test of hard service for many years.

Durston Gear Corp.
32 Maltbie Street
SYRACUSE
N. Y.

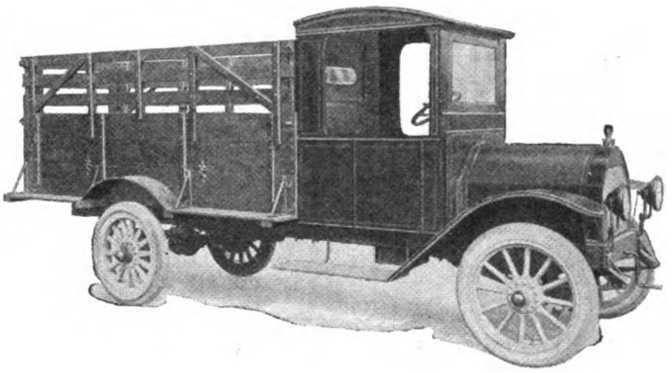
Write for data on our new Unit Power Plant Transmission for 1½ and 2-ton trucks.

The Luverne Farm Truck

Capacity Two Tons

PRICE $1800.00

Including Electric Starter and Lights, Semi-Enclosed Cab and Combination Grain and Stock Body

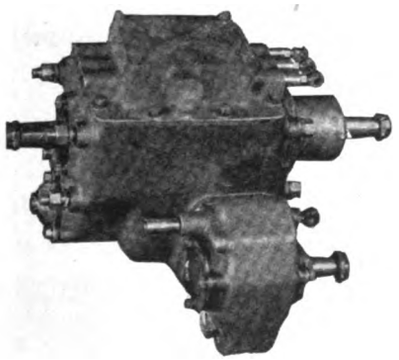


These trucks have been on the market for over three years, during which they have fully proven their ability to meet the requirements of the **Farm Trade** in a superior manner.

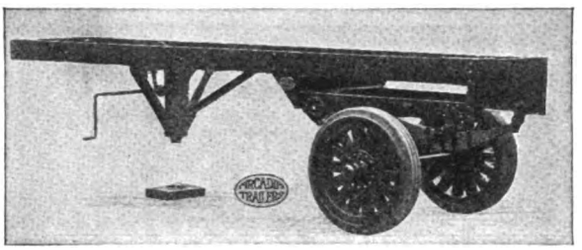
Ask for our Dealers' Proposition

LUVERNE MOTOR TRUCK COMPANY
LUVERNE MINNESOTA

FULLER
Transmissions



Fuller & Sons Mfg. Co.
Kalamazoo, Mich.



ARCADIA TRAILERS

Four Wheels—2, 2½ and 5 tons
Semi-Trailers—2, 4 and 6 tons
Log and Pole Trailers—2, 4 and 6 tons

There are many transportation problems that cannot be profitably figured without Trailers being used. Our engineers are ready to help you if you will give us the chance.

DEALERS—Some good territory is ready for you. We have a "Trailer for Every Trade" built under one roof. Write for information.

TRAILERIZE YOUR TRUCK WITH ARCADIA THE LEADING TRAILERS NEWARK, NEW YORK STATE

Arcadia Trailer Corporation
23 Murray Street
Newark, New York State

Sole Foreign Sales Representative, Automotive Products Corp., Woolworth Bldg., New York.

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Worm Drive *2½, 3½, 5 Tons*

Sanford Trucks

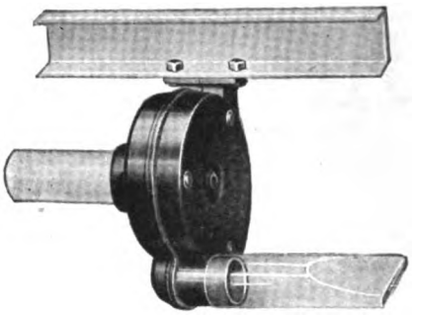
Sanford Model W-35. Capacity two and one-half tons. Bought by the Sheldon Axle & Spring Co., Wilkesbarre, Pa.

Included among Sanford users are concerns of national reputation in the automotive field, such as the Sheldon Axle & Spring Co., the H. H. Franklin Mfg. Co. and Smith Wheel, Inc.

For the individual, firm or corporation—singly or in fleets—Sanford meets the acid test of experience and wins on its merits.

Attractive Dealers' Contract

Sanford Motor Truck Co., Syracuse, N.Y.



THE VACUUM MUFFLER

An entirely new development in muffler design, overcoming in a scientific and practical way the biggest faults of the old style mufflers. Offers practically no back-pressure and guaranteed BLOW-OUT PROOF.

Approved as standard equipment by over eighty truck and tractor manufacturers.

THE VACUUM MUFFLER CORP'N OF AMERICA

Tribune Bldg. **New York**

WISCONSIN
CUSTOM BUILT
AXLES

Wisconsin Worm-Drive Axles give greater satisfaction to truck owners because they stand up longer under hard service.

This is due to their simplicity of design. With only one set of gears and bearings at six points there is nothing to get out of alignment.

Be sure your next truck is Wisconsin equipped.

Wisconsin Parts Co.
OSHKOSH **WISCONSIN**

Mechanical Engineer with 25 years experience

Mechanical Engineer with 25 years' experience, who has specialized in the practical design and construction of Motor Trucks and Omnibuses for 15 years with the leading manufacturers here and abroad, is desirous of forming a connection with a first class organization in which his unique knowledge could be fully utilized in an executive capacity.

Apply to M. E. 46, care of Offices of the Power Wagon, Chicago

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MUTUAL

"America's Greatest" TRUCK

If we could not prove that the Mutual is actually **"America's Greatest Truck,"** we could not long continue the use of this slogan without laying ourselves open to the charge of vainglorious boasting.

But we **do** prove it—first, by comparing our specifications, item by item with those of the best and highest priced and most famous trucks of other makes. And, second, by showing, by the truck itself, how scientifically these units have been engineered and how skillfully the truck has been built.

Send for our Folder

Mutual Truck Company
Sullivan - - - Indiana
U. S. A.

PIERCE GOVERNORS

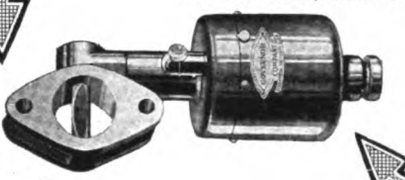
103
Motor Truck Manufacturers Now Furnish Pierce Governors as Standard Equipment

The overwhelming endorsement that the truck industry has given Pierce Governors proves conclusively two things:

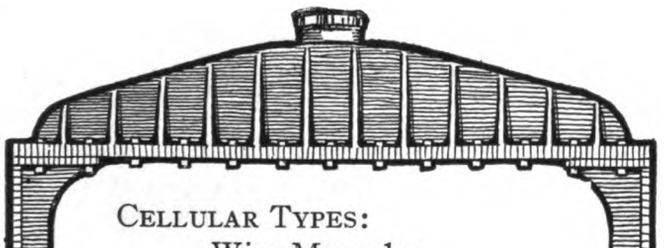
—it proves that these manufacturers recognize the necessity of automatic speed control if their trucks are to deliver maximum service at minimum cost.

—and it proves beyond any question of a doubt the superiority of Pierce Governors over governors of other types.

The Pierce Governor Company
Anderson, Indiana



World's Largest Governor Builders



CELLULAR TYPES:
Wire Mercedes
Square Wireless
Diagonal Wireless

TUBULAR TYPES:
Square Fin
Round Fin

Send Us Your Blueprints and Specifications.

THE G & O MFG. CO.
New Haven, Conn.

G&O
Radiator

FISK TRUCK TIRES

FISK F TRADE MARK

Are Dependable

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Brunswick TIRES

Each tire that bears the name Brunswick has paid perfection's price. Brunswick Tires could be built more cheaply, but the policy of the House of Brunswick for over three quarters of a century remains unchanged, despite the great and growing demand for its many quality products.

Brunswick Tires are offered with the assurance of unqualified merit. A test will prove what Brunswick Standards mean in fine tire building. Dealers will be repaid by writing for full particulars about Brunswick Tires and Brunswick Service.

The Brunswick-Balke-Collender Co.

General Offices: 623-633 S. Wabash Avenue
CHICAGO

There's a Brunswick Tire for Every Car.

Branches in Principal Cities of the United States and Canada.

Let us Prove to You that

OSHKOSH

4-wheel-drive-truck

hauls a capacity load at greater speed on less gas, than other two ton trucks.

The Oshkosh 4-Wheel Drive attains practically 100% transmission of motor power to the four wheels, all of which are driving wheels—front ones pulling and rear ones pushing.

In this truck there is virtually no power loss due to road slippage, whereas with the two-wheel drive the average loss, even on good roads, is 20%.

A few profitable territories are open. Write immediately for information.

Oshkosh Motor Truck Mfg. Co.
Oshkosh, Wisconsin

Experienced Salesmen Wanted

Men who have had experience calling on Motor Truck and Passenger Car dealers and distributors, will find this an unusual opportunity.

Single men preferred. Must be willing to travel anywhere. Good salary and expenses. Rapid increases as results warrant.

Applicants must have clean record, and be able to furnish first class references. They must be willing to be bonded at our expense.

Tell us fully about yourself, your experience, and the salary you would expect, also the territory previously covered and lines of merchandise sold.

Address Box H64, Power Wagon.

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CLASSIFIED WANTS

HELP WANTED	SITUATIONS WANTED	FOR SALE	FOR RENT	MISCELLANEOUS
Executives	Executives	Used Motor Trucks	Motor Trucks	Contract Work
Salesmen	Salesmen	Parts	Trailers	Repairs
Dealers	Agencies	Accessories	Tractors	Patents
Agencies	Foremen	Tires	Factories	Engineers
Foremen	Mechanics	Agencies	Garages	Schools
Mechanics	Miscellaneous	Businesses, etc.	Equipment	Machine Shops

FEBRUARY, 1920

HELP WANTED

Executives

WANTED

A first class, practical truck and automobile executive manager and director, to take charge of a $200,000 corporation in the South, who are distributors for three states for one of the best known and popular trucks and cars in the United States. Business has been established two years and the controlling owner desires to unload some of his responsibilities and will sell a 40% interest for $50,000 in cash and the right man can have the presidency of the company if he so desires. The gross income on contracts closed for this year is over $60,000, if the products are delivered. In addition to salary and dividend the right man can also have a participation in commissions, but it must be the right man of the highest integrity and no man need apply except in writing, giving his references and experiences, and is able to put $50,000 cash into the business, if satisfied after investigation. Address your letters to W. S. Thomson, 100 Broadway, New York, and mark them "Confidential." Address Box 40, Power Wagon.

Salesmen

A High Class Truck Salesman

One who is experienced and is seeking to locate with an established business. The Bunker Auto Co, 249 W. Douglas, Wichita, Kansas.

HELP WANTED

Salesmen

SALESMEN

Must be experienced, calling on the Automotive Trade.

Not over 35—single preferred.

Must be willing to travel anywhere.

Must be able to sell a publication of highest merit to Motor Truck and Passenger Car Dealers, jobbers and large users of trucks.

Must be able to furnish references attesting good character and integrity.

Excellent opportunity for advancement—good salary and expenses to start, and frequent increases as results justify.

Tell us fully about yourself, the salary you would expect, your age and your experience.

Address Box H242, Power Wagon.

MANUFACTURER'S AGENT

I CAN SELL YOUR PRODUCT

Manufacturer's agent, having sold the output of two parts manufacturers, is in the market for pleasure car or truck parts. Will place your product before all automotive manufacturers in Michigan—twelve years in this territory — big acquaintance — straight commission. Box 119L, Detroit Office Power Wagon, 205 Kresge Bldg., Detroit.

HELP WANTED

Executive

Automotive Engineer

Mechanical engineer of broad experience in automobile, gasoline and electric truck and axle design and manufacture, desires connection with progressive company. He is energetic, resourceful, possesses good personality and is backed by a thorough technical education. At present employed as chief engineer of well known motor truck and axle company. Best references. Address Box 33M, Power Wagon.

CONTRACT WORK

METAL STAMPINGS

Tools, Dies, Jigs, Fixtures, Lathe and Planer Work

Send us your inquiries

Great Lakes Pressed Steel Corp.

1401-1411 Niagara St., Buffalo, N. Y.

USED MOTOR TRUCKS FOR SALE

USED TRUCKS

1-Ton Garford, express body, canopy top, windshield, used as service truck, good running condition, tires O. K.

1½-Ton Garford, express body, cab and windshield, thoroughly overhauled. Front tires new, rear tires O. K.

5-Ton Garford, dump body, hydraulic hoist, thoroughly overhauled, tires O. K.

6-Ton Garford, dump body, hydraulic hoist, good running condition, tires O. K.

We also have some used trucks of other makes, and will send you our used truck list on request.

Garford Motor Truck Company, Inc.

Calumet 5060 23rd and Indiana Avenue

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WEST
Cast Steel Wheels

Hubs Cast Integral
Any Make of Axle
Any Make of Tire

Specify West Cast Steel Wheels On Your Next Truck Order

THE WEST STEEL CASTING CO.
Cleveland, Ohio

New York	Chicago	Detroit
1790 Broadway		205 Kresge Bldg.

"Watch the WEST STEEL WHEELS Go 'Round"

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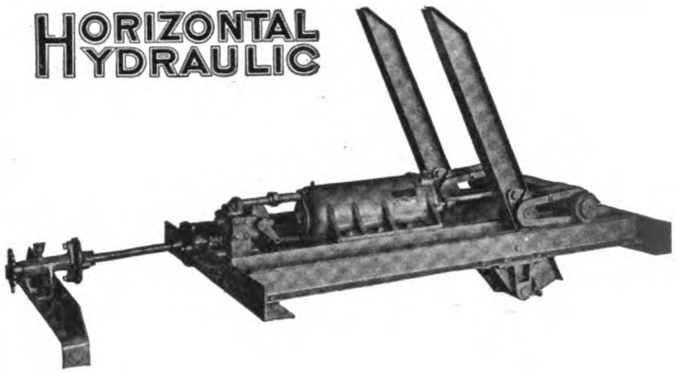


Increases Efficiency of "All-Purpose" Bodies

Efficiency is comparative. It is reckoned in terms of percentage.

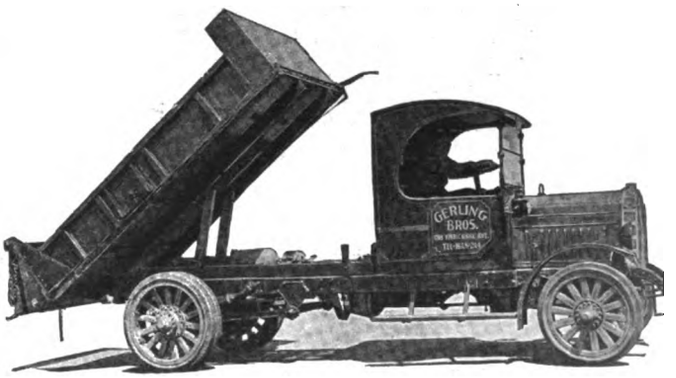
The "All-Purpose" body is efficient because it adapts the truck for hauling all classes of materials.

The Horizontal Hydraulic Hoist increases the percentage of efficiency, because:

1. It delivers a high dumping angle—unloads the truck quickly.
2. It increases the number of actual trucking hours.
3. It is uncomplicated and trouble-free.

Truck buyers are always looking for the motor truck of greatest efficiency. They cannot overlook the truck equipped with Horizontal Hydraulic Dumping Units.

Write today for our special folder containing prices and specifications on "All Purpose" Bodies and Horizontal Hydraulic Hoists.



Horizontal Hydraulic Hoist Co.

General Sales Office:
456 Book Building, Detroit, Mich.

Factory: 31 to 37 Twenty-Fifth St., Milwaukee, Wis.

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Wilson dependable MOTOR TRUCKS

Why Do Motor Truck Dealers Make Money?

This is a very frank and important talk to automotive dealers, and those intending to enter the business, relative to the vital question of profits to be made and how to make them

THE established truck dealer who has gained wisdom through long experience knows how easy it is to sell a well advertised motor truck. And he knows the hardships that come with trying to sell an unknown truck.

It is seldom, therefore, that you find the experienced motor truck merchant contracting for an unadvertised and unknown account.

He does not want to do the pioneering. He does not want to put his time and resources back of an unknown product. When, for example, he tries to sell a customer the "Blank" truck, he does not want to hear the prospective buyer say: "The 'Blank' truck? I *never heard* of it!"

You old dealers know that this does not spell success. And you younger ones, and you who are thinking of going into the business, can gather a lesson from the older dealer's experience.

For the American buyer today does not absorb voluble promises and doubtful facts as he may have done in days of yore. He has learned something and he is influenced by, and guided to the door of, the truck maker who has sufficient faith in his product to come out boldly in great advertising channels and state his claims openly to the world—in such reputable publications that the very fact that they publish his claims is a substantial guarantee of their dependability.

The appearance of this advertisement marks the thirty-seventh year of the continuous existence of the J. C. Wilson Company as a manufacturer of heavy duty haulage vehicles—first horse-drawn and then motor-driven. For many years of this time we have been telling the public, through the medium of the great national publications, of the worth of Wilson motor truck construction and the dependability of Wilson truck service.

The result is that the public knows Wilson trucks. In addition to their great mechanical worth they are an advertised asset to the dealer, they possess a *good-will value* which makes sales easier for him, and creates a greater re-sale value for the retail buyer.

The name "Wilson" as applied to motor trucks is so deeply imbedded in the public consciousness, so thoroughly intrenched in public favor, that sales (and re-sales) of Wilson trucks are infinitely easier to make than if we depended upon circulars and postal card campaigns to acquaint the public with our product.

There can be no question about this. What are the big selling passenger cars? What are the big selling soaps? What, even, if you please, are the big selling chewing gums? The answer writes itself, and you know it: They are the passenger cars, the soaps, the chewing gums—*and the motor trucks*—whose makers come into the open and state their claims in the great journals of the world.

This is only good, sane sense. If you sell an advertised product you are not up against the continued, heart-breaking barrier of obscurity, of "I never heard of your truck."

It may be that some of you old dealers who read this are getting ready to take on the sale of motor trucks, or that some of you men in other lines of business are thinking of taking up the sale of trucks as a vocation. If you are we would like to hear from you. Perhaps your territory is still open.

Write us. There's money in the business, and it's a clean business—a business man's business.

Let us send you (free) a booklet we have prepared called "Money in Motor Trucks." It is interesting and instructive and will open up to you an avenue for clean profit-making that will be to you an industrial revelation.

1½-2½-3½-5 Ton, All Worm Drive

J. C. WILSON COMPANY, DETROIT, U. S. A.

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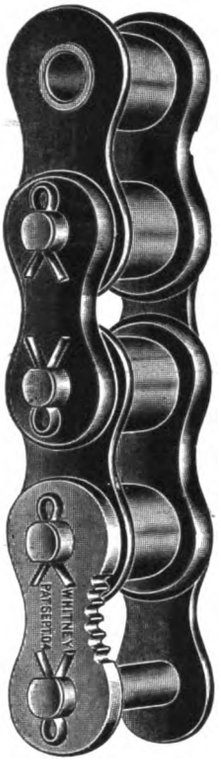
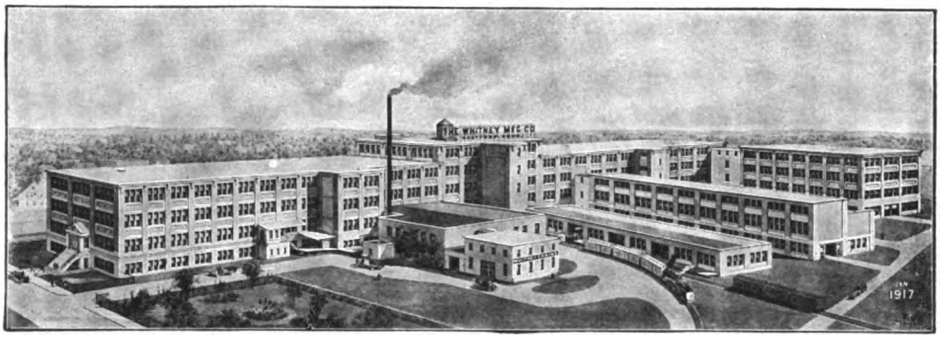


Roller Type



"WHITNEY" CHAINS

Equip Your Motor Trucks and Tractors with "Whitney" Chains

Now that the motor truck is handling so much of the freight that was formerly cared for by the railroads, it must run on a schedule almost as exacting as that of the railroad train itself. This emphasizes the necessity of selecting a chain which can be relied on under all conditions of speed, road and weather.

THE WHITNEY MFG. CO.

HARTFORD, CONN.

Chains **Keys and Cutters** **Hand Milling Machines**

Silent Type

"The Spring is the Thing"

MATHER SPRINGS

Scientifically Heat-Treated

Unequalled For

Lightness, Flexibility and Endurance

Genuine made only by

THE MATHER SPRING COMPANY

Toledo, Ohio.

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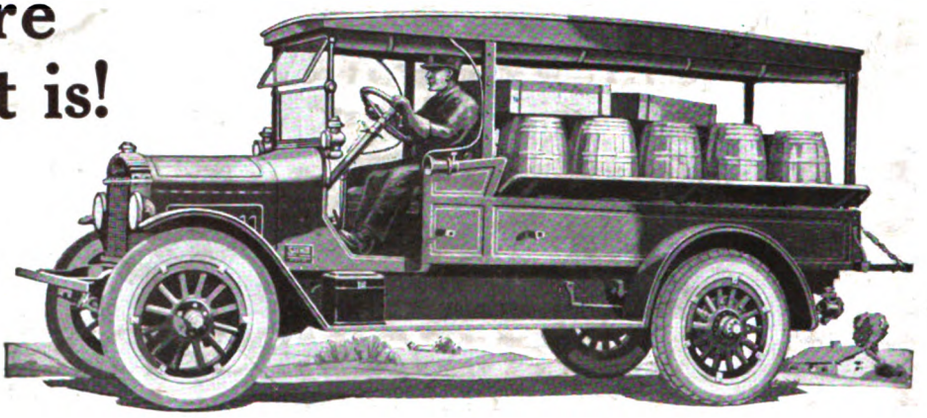
Stewart

MOTOR TRUCKS

Here it is!



The Truck Sensation for 1920

The new Stewart 2000-lb. Delivery Truck—electric lights, electric starter, magneto ignition, five-inch cord tires, chassis price, $1595

THE real event of the year in truck-building; a big, fast, flexible Stewart Delivery Truck—all truck from the ground up, and at a popular price. Not a bit of passenger car construction in it—every part designed by truck engineers for truck purposes only.

Fast for delivery and rush jobs; strong for the heavy hauling from railroad or warehouse; quick in the getaway; beautifully designed and balanced; no solid tires to rack the car and damage the goods; proof against sudden, hard shocks; ready for any weather and the toughest kind of going.

With all its rugged truck strength, this Stewart delivery truck handles and ticks off trips with the ease of a taxi. It has the speed, convenience and comfort of the frailer, half-breed passenger-car-truck.

And this new Stewart is a wonderful buy. Its cost is low. Price others, add their "extras," and prove up the claim that this is America's greatest truck value.

And all the famous "less-cost-to-run" Stewart features are included—simple design, hundreds of needless parts eliminated; oilless bushings, doing away with 35 grease cups and the time filling them; heavy truck axles; cast tank radiator: front bumper; rebound spring plates; internal gear drive axle, delivering more than 92% of the engine power to the rear wheels—all features that have made the Stewart's world-wide reputation for economy.

No wonder that the Stewart 2000-lb. Delivery Truck was a hit at the national truck shows, and is a truck headliner for the year. It is the response of the Stewart engineers, after seven years of progressive truck-designing, to the demand of business for a double-utility truck, combining speed and covenience with durability and capacity—a truck that is ready for unusual needs and conditions, and continually surprises you in its actual performance.

5 SIZES: ¾ ton—1 ton—1½ ton—2 ton—3½ ton

STEWART MOTOR CORPORATION, Buffalo, N.Y.

Quality Trucks since 1912

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62

POWER WAGON

Number 184 CHICAGO, MARCH, 1920 Price 15 Cents

OCCASIONALLY some truck-owner asks if the corners of the Kelly Caterpillar won't break off.

The best answer to that is to let him go out and observe the condition of the Caterpillar tires he sees on the streets. He will be surprised to find that Caterpillars show less damage from chipping than any other type of tire.

The reason is simply that the more resilient a truck tire is, the harder it is to chip it. The same side vents that make the Caterpillar more resilient also make it almost impossible to chip.

KELLY-SPRINGFIELD TIRE CO.
NEW YORK, N. Y.

Protected by U. S. Patents
June 28, 1904
Aug. 31, 1915
Mar. 14, 1916
Feb. 19, 1918

KELLY SPRINGFIELD TRUCK TIRES

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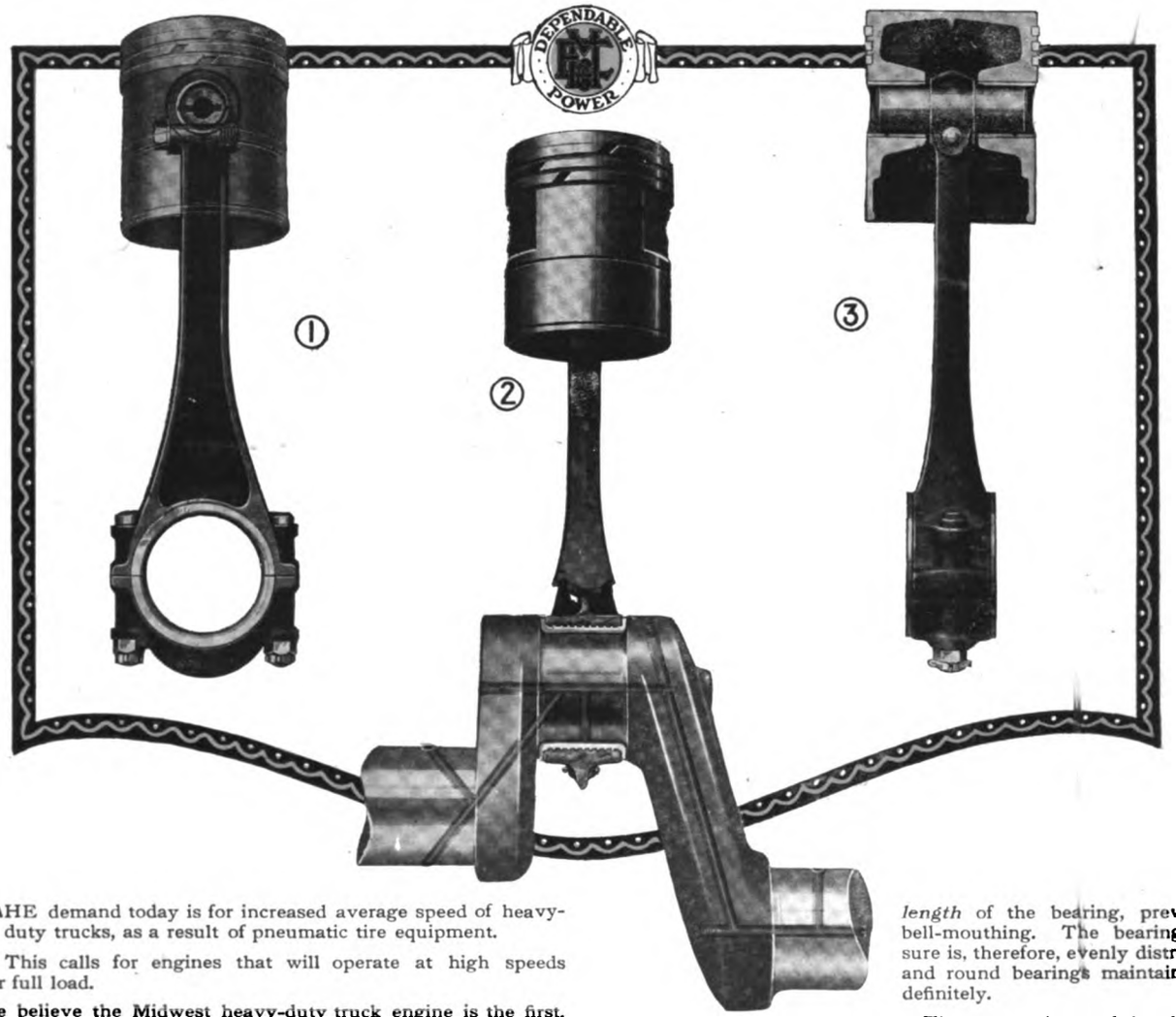
MIDWEST

TRUCK *and* TRACTOR ENGINE



THE demand today is for increased average speed of heavy-duty trucks, as a result of pneumatic tire equipment.

This calls for engines that will operate at high speeds under full load.

We believe the Midwest heavy-duty truck engine is the first, possibly the only, completely developed engine that *can* be safely operated under full load up to 1500 R.P.M. and is guaranteed under such conditions.

The above illustrations graphically tell how the design of the Midwest engine enables it to perform satisfactorily at high engine speeds.

All the bearings on the 3" whip-proof crankshaft are floated on a film of oil. The oil pressure is maintained according to the *load on*, rather than *speed of*, the engine by an automatic relief valve on the front bearing. The oil travels under pressure to the bearings, forming a film of oil at the moment of minimum pressure—not at the moment of maximum bearing pressure.

The connecting rod (Fig. 1) supports the full *width* of the bearing down to the center and the ribbed cap does the same on the lower half. The connecting rod (Fig. 3) also supports the full *length* of the bearing, preventing bell-mouthing. The bearing pressure is, therefore, evenly distributed, and round bearings maintained indefinitely.

The connecting rod bearing oil-film (Fig. 2) is formed just before the impulse stroke of the engine. As no shims or grooves are used, the oil must pencil, or spiral, into a film, floating the bearings continuously.

The pictures above clearly depict the liberal bearing area of the wrist pin, which is positively locked in the connecting rod. This construction prevents wrist pin moving endwise and scoring cylinders.

This unique construction of connecting rod and bearing is typically Midwest, and is one of the reasons why the Midwest heavy-duty truck engine is able to perform satisfactorily under present day, high speed, transportation requirements.

Complete information as to the general construction of the Midwest engine sent on request. Please address Sales Division 16.

THE MIDWEST ENGINE CO., Indianapolis, U. S. A.

Dependable Power

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Cooling Systems embodying Long Spiral Tubing were adopted as standard for War Trucks—they are equal, as well, to all peace time requirements

THE system of automotive radiation that is recognized as *paramount—supreme*—in its vast field; the system that eliminates the hazards, the disappointments, the failures, by placing at the command of the producer, the skilled, experienced, *specialized services of engineers* who study the requirements of *every* motor for *every* purpose. A record of 18 years of unequalled accomplishments is assurance of valuable co-operation.

No engine can be more efficient than its cooling system.

Look to it then that your motor be permitted to realize its maximum of efficiency through the aid of a cooling system engineered to suit its requirements.

LONG MANUFACTURING CO., DETROIT, MICHIGAN

Pioneer Makers of Cooling Systems for Gasoline Engines

LONG

COOLING SYSTEMS

The Recognized Standard for Tractor, Trucks and Motor Cars.

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"NORMA"
PRECISION
BALL BEARINGS
(PATENTED)

PRACTICALLY all high-grade, reliable magnetos and lighting generators are "NORMA" equipped. The reason most owners don't realize it is that their attention is never drawn to a part that so silently, so surely does its duty. The trouble-making parts are the ones that get attention—and condemnation.

See that your electrical apparatus is "NORMA" equipped.

THE NORMA COMPANY OF AMERICA
Anable Avenue
Long Island City
New York

Ball, Roller, Thrust and Combination Bearings

POWER WAGON

An exponent of the most enlightened thought and practice of the motor truck industry.

Published monthly by
THE POWER WAGON PUBLISHING COMPANY
544 Lake Shore Drive, Chicago

Entered as second-class matter December 2, 1907, at the post office at Chicago, Illinois, under the Act of Congress of March 3, 1879.

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205-6 Kresge Bldg.

CLEVELAND
J. M. CHIPMAN
1774 E. Sixty-fifth St.

CHICAGO
R. F. MAC VEIGH
544 Lake Shore Drive

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ROSS STEERING GEARS

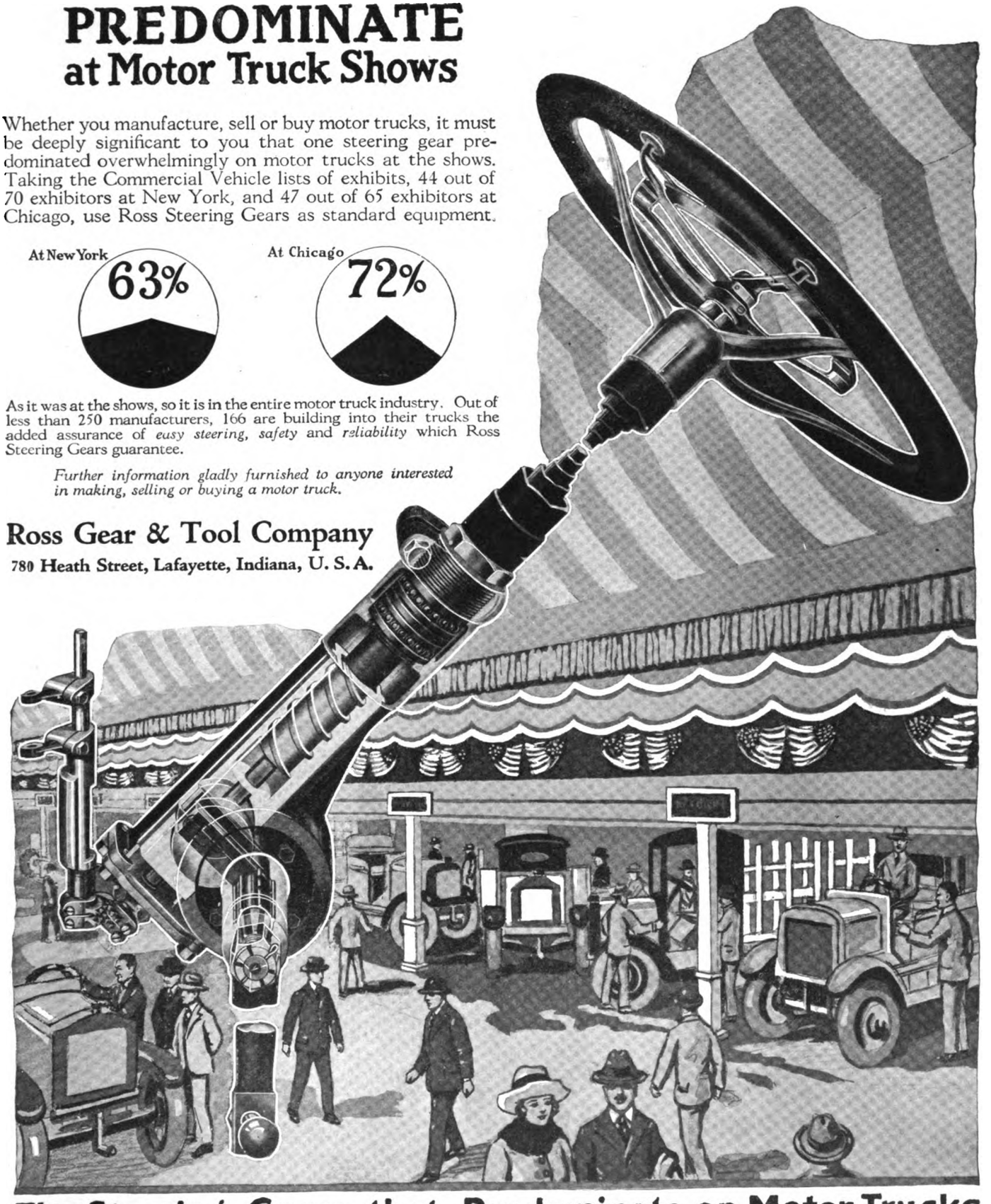
PREDOMINATE at Motor Truck Shows

Whether you manufacture, sell or buy motor trucks, it must be deeply significant to you that one steering gear predominated overwhelmingly on motor trucks at the shows. Taking the Commercial Vehicle lists of exhibits, 44 out of 70 exhibitors at New York, and 47 out of 65 exhibitors at Chicago, use Ross Steering Gears as standard equipment.

As it was at the shows, so it is in the entire motor truck industry. Out of less than 250 manufacturers, 166 are building into their trucks the added assurance of *easy steering*, *safety* and *reliability* which Ross Steering Gears guarantee.

Further information gladly furnished to anyone interested in making, selling or buying a motor truck.

Ross Gear & Tool Company
780 Heath Street, Lafayette, Indiana, U. S. A.



The Steering Gears that Predominate on Motor Trucks

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No Other Truck Has These Three Features

PROBABLY the most striking Clydesdale feature is the patented "Driver Under The Hood" which relieves the strain on every part of the truck by automatically regulating the generation of power to meet every change in the "pull."

Prospects are surprised when given a demonstration of this Clydesdale feature. It is hard to mak people believe, without actually seeing the "Driver Under he Hood" in operation, that it will take the truck up hill, down hill and through unusual conditions on the level without changing the speed, and without attention of any kind from the driver.

No Other Truck Has It

"The Driver Under the Hood"

Another feature is the Clydesdale's radiator. Constructed of cast aluminum tanks, seamless copper tubes and staunch guard bars, it requires a minimum of repairs under the roughest conditions. Its design insures proper cooling.

A third feature is the appearance of the truck itself. The trim, sturdy construction reflects skillful engineering and carries the conviction that Clydesdale strength and power are equal to any emergency.

These and other outstanding Clydesdale features often influence a sale when a choice is made between Clydesdale and other good trucks.

One to Five Tons Net Load

THE CLYDESDALE MOTOR TRUCK COMPANY
CLYDE, OHIO

CLYDESDALE

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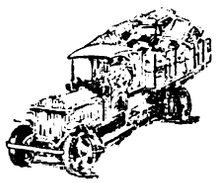

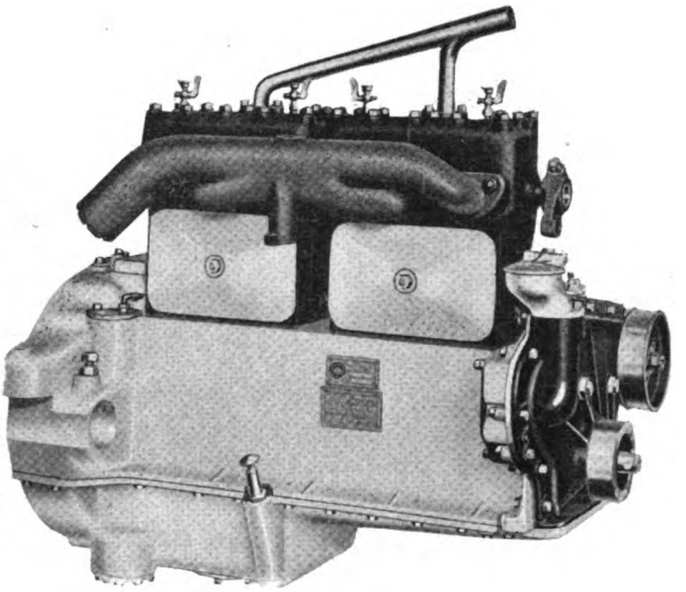

The Obligation of Supremacy

In an organization that has maintained a position of pre-eminence in motor building for nearly two decades, there is a well-defined OBLIGATION to **go on and on—forever striving for the realization of the ideals upon which that position was founded.**

The Continental Motor that is produced *today*, therefore, must of necessity live up to the performance of those hundreds of thousands of motors that are now in use in motor vehicles everywhere.

And as an acknowledgment of that obligation to the truck builder, dealer and owner—each Continental Motor carries on its crank case the Red Seal.

CONTINENTAL MOTORS CORPORATION

Offices: Detroit, Michigan Factories: Detroit—Muskegon

Largest Exclusive Motor Manufacturers in the World

CONTINENTAL MOTORS · Powerful as the Nation · AMERICA'S STANDARD ·

Continental Motors

STANDARD POWER FOR TRUCKS, AUTOMOBILES AND TRACTORS

Please mention "Power Wagon" when writing to advertisers.

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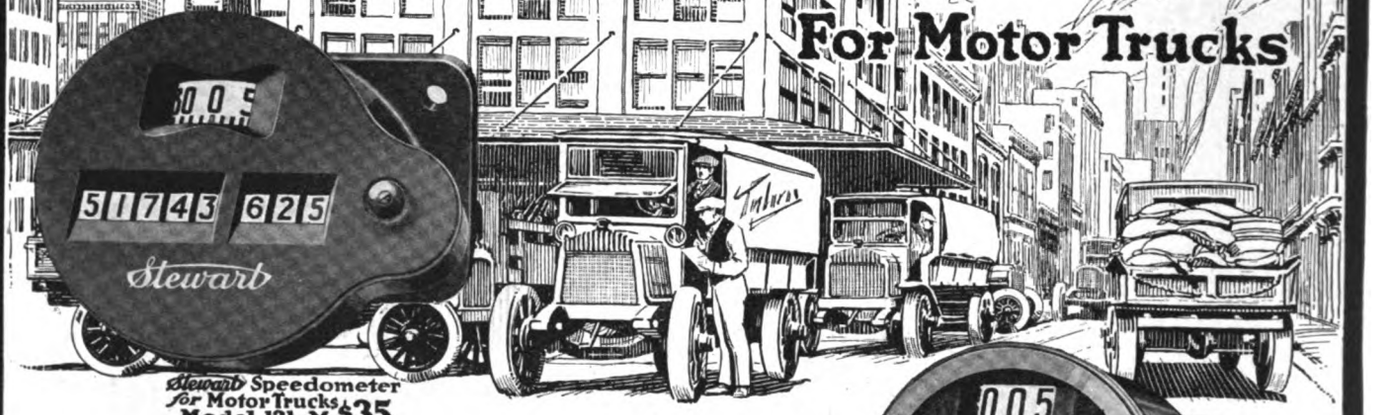
Stewart Custom Built NECESSITIES For Motor Trucks



Stewart Speedometer for Motor Trucks Model 131-M $35

Cost per Mile is the Vital Problem!

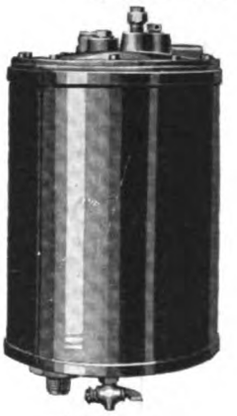
WITHOUT a Stewart Truck Speedometer you are in the dark. With it, **you know.** To be operated with greatest efficiency and economy, every truck **must** have a Stewart Speedometer. Tells you the mileage you get from gas, oil and tires. Tells you how much territory your truck covers daily. Pays for itself by reducing expenses.

The Stewart Vacuum System is the only thoroughly satisfactory, absolutely trouble-proof gasoline feed for trucks ever devised. A Stewart Warning Signal to clear the road, and Stewart Searchlights to prevent accidents after dark, are other safety-first necessities that no truck can afford to be without.

Truck dealers find the Stewart line most profitable to handle
Write for Proposition

Stewart-Warner Speedometer Corporation
Chicago, U. S. A.

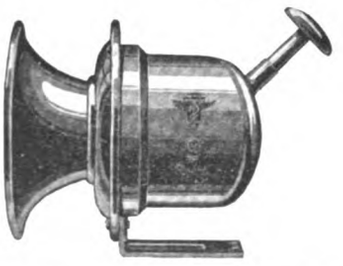
Stewart Speedometer for Motor Trucks Model 131-Y $25

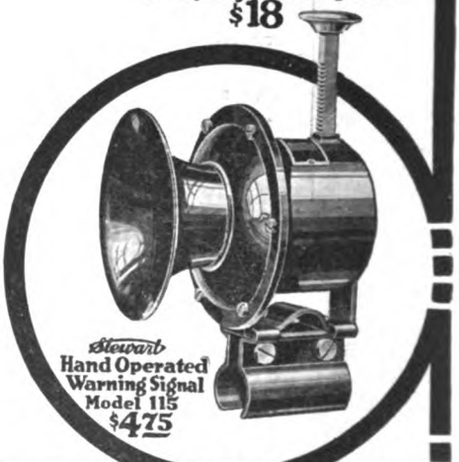


Stewart Heavy Duty Vacuum System $18

Stewart Searchlight Model 139-C $7.50 Mirror on back

Stewart Hand Operated Warning Signal Model 151-A $3.75





Stewart Hand Operated Warning Signal Model 115 $4.75

"No Motor Truck Complete Without Them"

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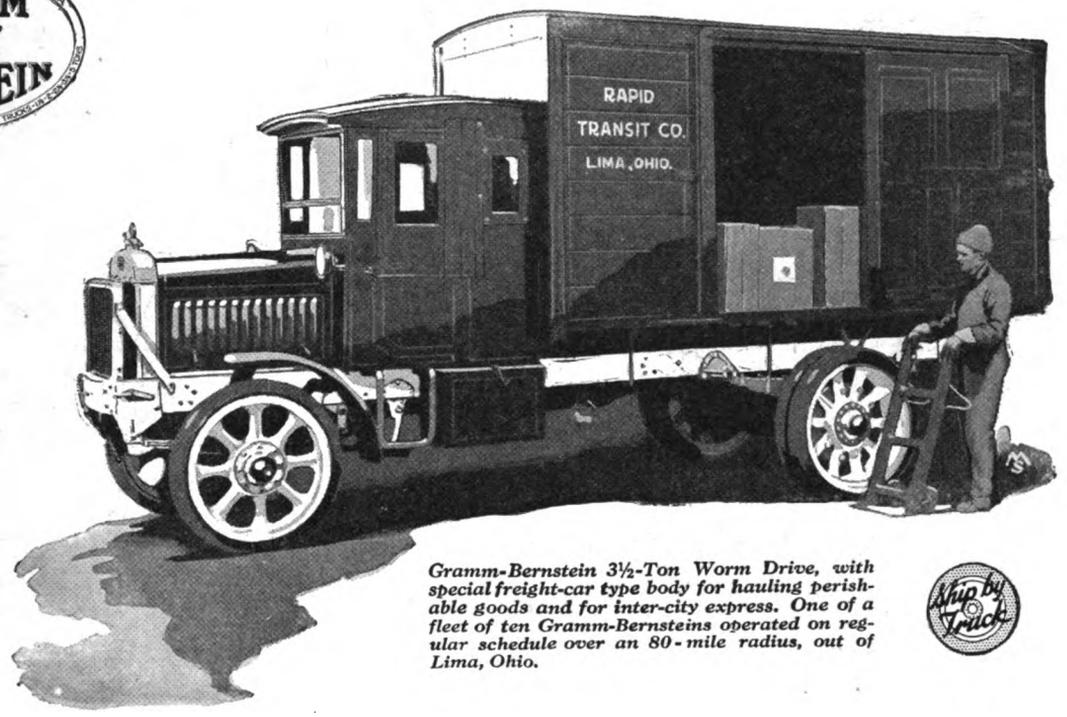
GRAMM-BERNSTEIN TRUCKS



Gramm-Bernstein 3½-Ton Worm Drive, with special freight-car type body for hauling perishable goods and for inter-city express. One of a fleet of ten Gramm-Bernsteins operated on regular schedule over an 80-mile radius, out of Lima, Ohio.

Ship by Truck

It Establishes Its Own Preference

The Gramm-Bernstein Truck is always worth its price.

It is not a difficult matter for the Gramm-Bernstein dealer to establish this fact.

It is all the easier because he is not obliged to justify price by comparison with other trucks.

The Gramm-Bernstein design contains certain fundamental patented superiorities.

These betterments give the Gramm-Bernstein truck the advantage, because they are not to be found in any other trucks.

The exclusive, constant-mesh transmission, the patented power take-off, the oilless universal joints, the radiator shroud, the complete equipment, and other individualities, in themselves, make the truck worth more.

The dealer does not have to waste time and effort in explaining away price differences.

He sells the Gramm-Bernstein Truck on its distinctive superiorities of construction and service, made possible by B. A. Gramm's twenty years of development in the organization and the building of better trucks.

Because the dealer does not have to enter competition, he establishes Gramm-Bernstein preference more quickly and with greater profit and reputation to himself.

All Gramm-Bernstein Transmissions are trouble-proof and are provided with a pad for attaching Gramm's Basic Patent Power Take-off. Dealers and truck owners should assure themselves that any trucks purchased with power take-off do not infringe B. A. Gramm's Basic Patent No. 1194994

The Gramm-Bernstein Motor Truck Co., Lima, Ohio

Pioneers Since 1901—Builders of the First Liberty (U. S. A.) Truck

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Immediate

Today we are so thoroughly and soundly organized, and so ably supported by a producing plant that we not only can take care of our established dealers but can also arrange for a few unsold territories and make immediate deliveries.

Ace advertising began last August. Excepting a demonstrator and a Test Machine, Ace Trucks were then a promise.

Within a few weeks, Ace Distributors and Dealers were signed up and made their deposits on as many Trucks as we could produce.

The first of November we were sold out for eighteen months on the factory production at that time.

By January first we had added new Distributors and Dealers and increased our factory output.

A Truck Franchise is no good unless you can get Trucks to sell.
Ace Trucks are ready in 1½ Ton and 2½ Ton capacities.
Other sizes ready soon.

Please mention "Power Wagon" when writing to advertisers.

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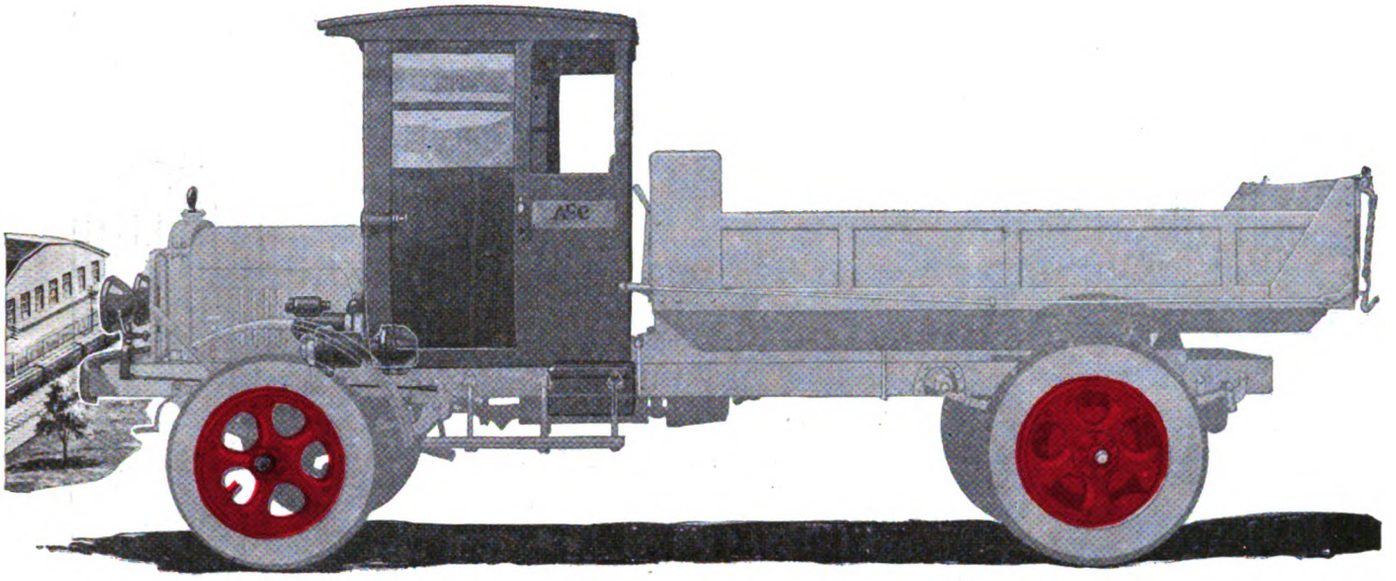

The First Complete Motor Truck

About three years ago the tendencies of Motor Truck service pointed beyond the unfinished frame or chassis toward the completely finished Truck ready for load, road and driver. Our Engineers were the first to design and build such a Truck. War emergencies prevented Ace Trucks from reaching the market two years ago. With the completion of our war contracts, we moved at once into Ace production. The acceptance of the Ace idea was immediate and conclusive.

Delivery

The Dealer Must Be Paid

The Truck Dealer is a necessary link in the Selling chain. As such he has a right to a good income. These facts are recognized in the Ace Selling Agreement, which is as far ahead of ordinary contracts as Ace Trucks are ahead of ordinary Trucks. Ace Contracts involve good Trucks, at good prices, with good discounts for good dealers who deserve good incomes as a reward for good work.

The Ace Contract is Different

The Ace Selling Agreement was designed new—from the ground up. It puts Truck Sales on a business basis. It cuts out the speculation. It adds power to every effort the Dealer makes. It recognizes the Dealer as a partner in the promotion plan, insures his position, pays him well, protects his territory, and offers him suitable rewards for good work. It also provides a service and repair parts business on a new plan.

Ace

The AMERICAN MOTOR TRUCK COMPANY
NEWARK OHIO.

THE AMERICAN MOTOR TRUCK COMPANY, Newark, Ohio

Now I'm ready to talk Ace Contract

Name _____

No. _____ Street _____ City _____ State _____ P. W.-Mar.

Please mention "Power Wagon" when writing to advertisers.

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Service MOTOR TRUCKS

Builders of Business

From the Buyer's View Point

In choosing a Motor Truck the purchaser does not wish to experiment. He demands a carrier of proven worth—one that will fit the exact requirements of his business in an efficient, economical manner. On that basis SERVICE Dealers are finding it increasingly less difficult to sell SERVICE Motor Trucks.

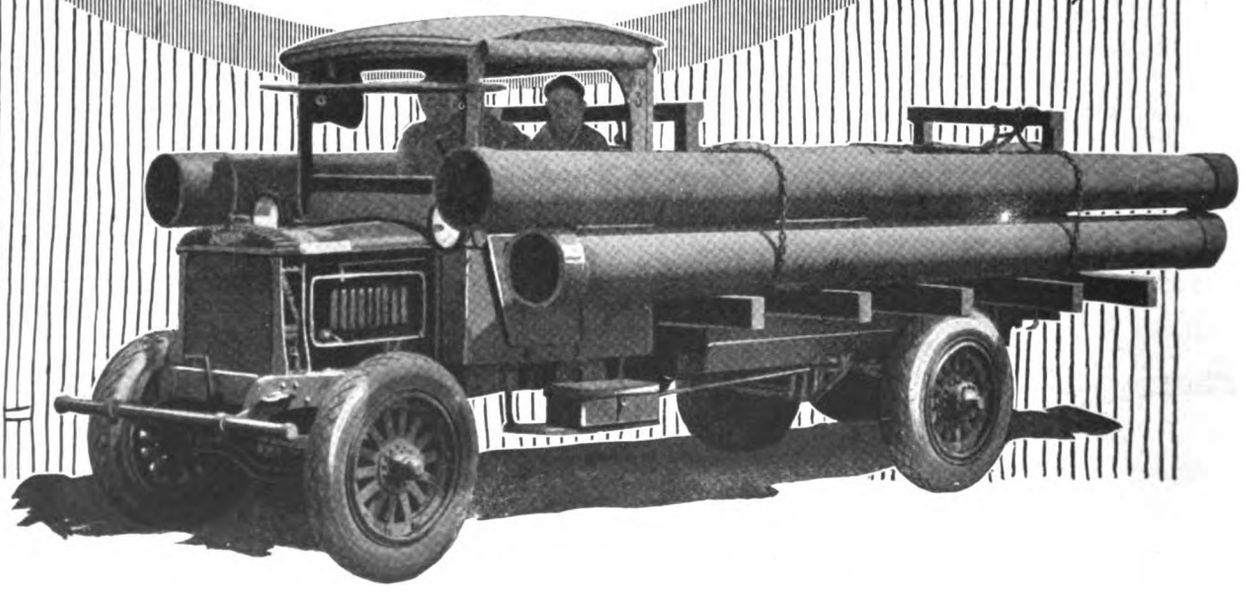
In writing to a prospective dealer, the Service Truck Sales Co., SERVICE distributors, located at Indianapolis, stated as follows:

"We took up the sale of SERVICE Trucks about four years ago. They have proved themselves beyond a doubt in quality and performance, equal to any truck on the market. Seventy-five per cent of our business is repeat business. In the four years we have been handling this line of trucks, we have had nothing but praise for its performance."

If you are interested in selling Motor Trucks of dominant value—write today. Be sure and mention the territory you desire. Seven models from 1 to 5 tons.

Service Motor Truck Co., Wabash, Ind., U. S. A.

NEW YORK—87-89 West End Avenue
CHICAGO—2617-25 So. Wabash Ave.



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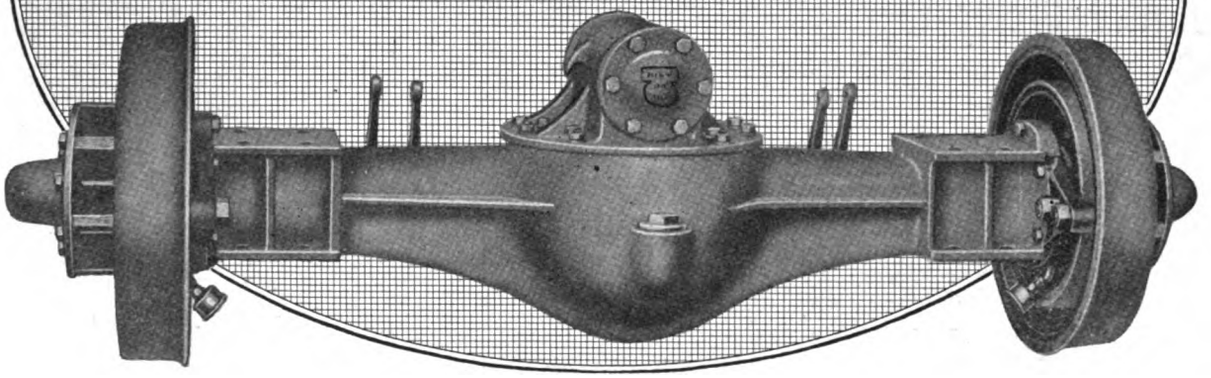
WISCONSIN AXLES



Wisconsin Axles in the Oil Fields

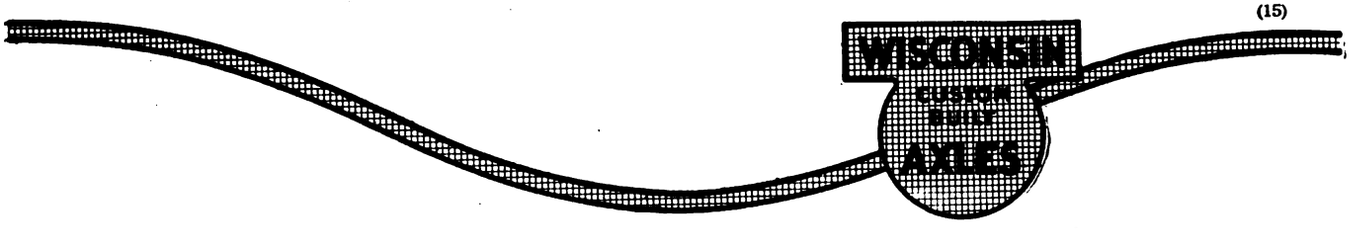
There is no harder service for trucks than in the oil fields. In Oklahoma the oil men demand Wisconsin Axles. They stand up under the hardest service. They track well in the poorest of roads where other axles cannot operate efficiently or successfully.

If trouble occurs the simplicity of construction demands no special knowledge to make adjustments or replacements. The materials are the best obtainable.

You will find them used only on high grade trucks.

WISCONSIN PARTS COMPANY, Oshkosh, Wisconsin

(15)



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1-ton, 1½-ton, 2½-ton, 3½-ton

Four models—meet every truck requirement

Every truck prospect is a TRAYLOR prospect—the merchant with small parcels to deliver, the farmer, baker, milk dealer, florist, drayman and the prospect who handles big tonnage.

No missionary work on the part of the dealer's sales force is wasted—every truck requirement can be filled by the four TRAYLOR Truck models.

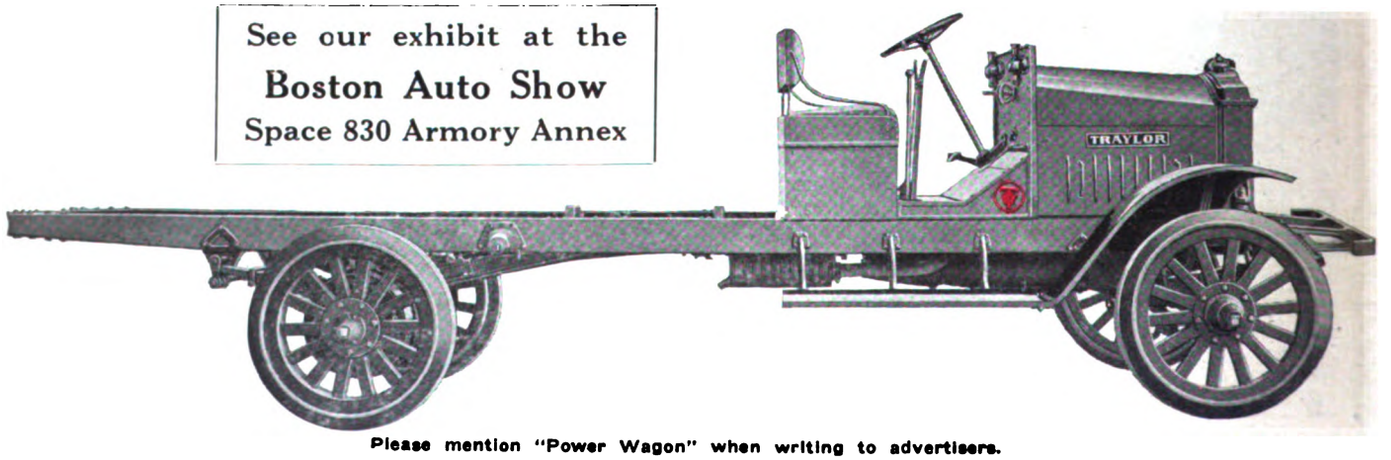
And back of each model is the reputation of the Traylor Engineering & Manufacturing Company, who for many years have stood in the front rank of manufacturing and engineering achievements.

Good reliable dealers who want to build a permanent profitable business are wanted. Write or wire for exclusive territory.

Traylor Engineering & Manufacturing Co.

Truck and Tractor Division **Cornwells, Pa.**

See our exhibit at the
Boston Auto Show
Space 830 Armory Annex



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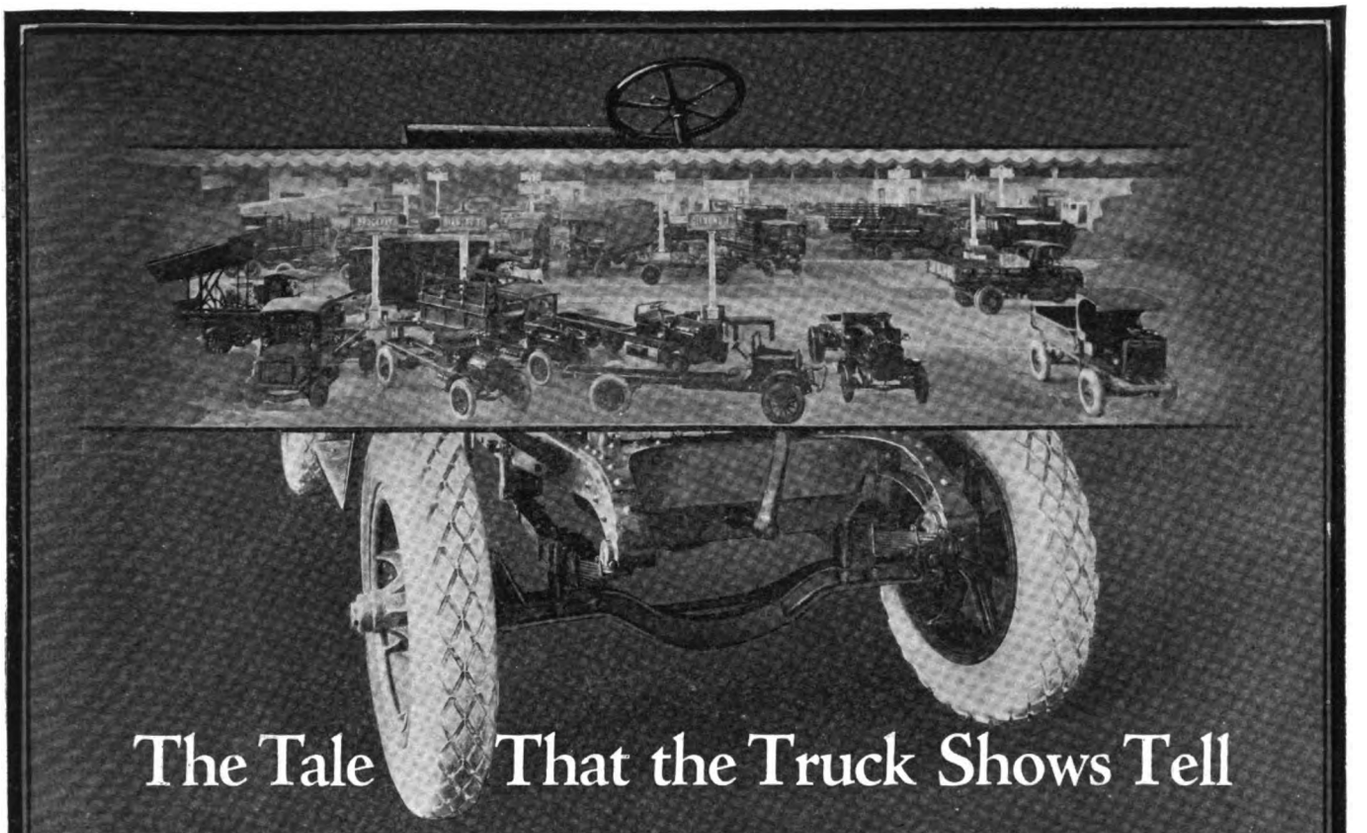

The Tale That the Truck Shows Tell

ALL of you manufacturers and dealers who visited the Truck Shows must have noted the big percentage of pneumatics—on the largest trucks and the smallest.

This proves clearly that the pneumatic tire has made good—found its place—in heavy-duty service. For Kellogg had removed the only obstacle to its complete success, with a new heavy duty engine-driven tire pump. Here again the Truck Shows furnished the evidence. **With two exceptions, every pneumatic-tired truck that carried an engine driven tire pump was equipped with a Kellogg.**

They're all coming to it. Even those trucks that have no pump equipment have openings in the transmission to fit the Kellogg. They're **preparing.**

Are **you** preparing, dealers? Here is a trade waiting, growing—**wide open.** Get set to enter a money-making field—a field that is rapidly expanding.

Write today for discounts and full details.

KELLOGG MFG. CO. ROCHESTER NEW YORK

KELLOGG
ENGINE DRIVEN
Tire Pump

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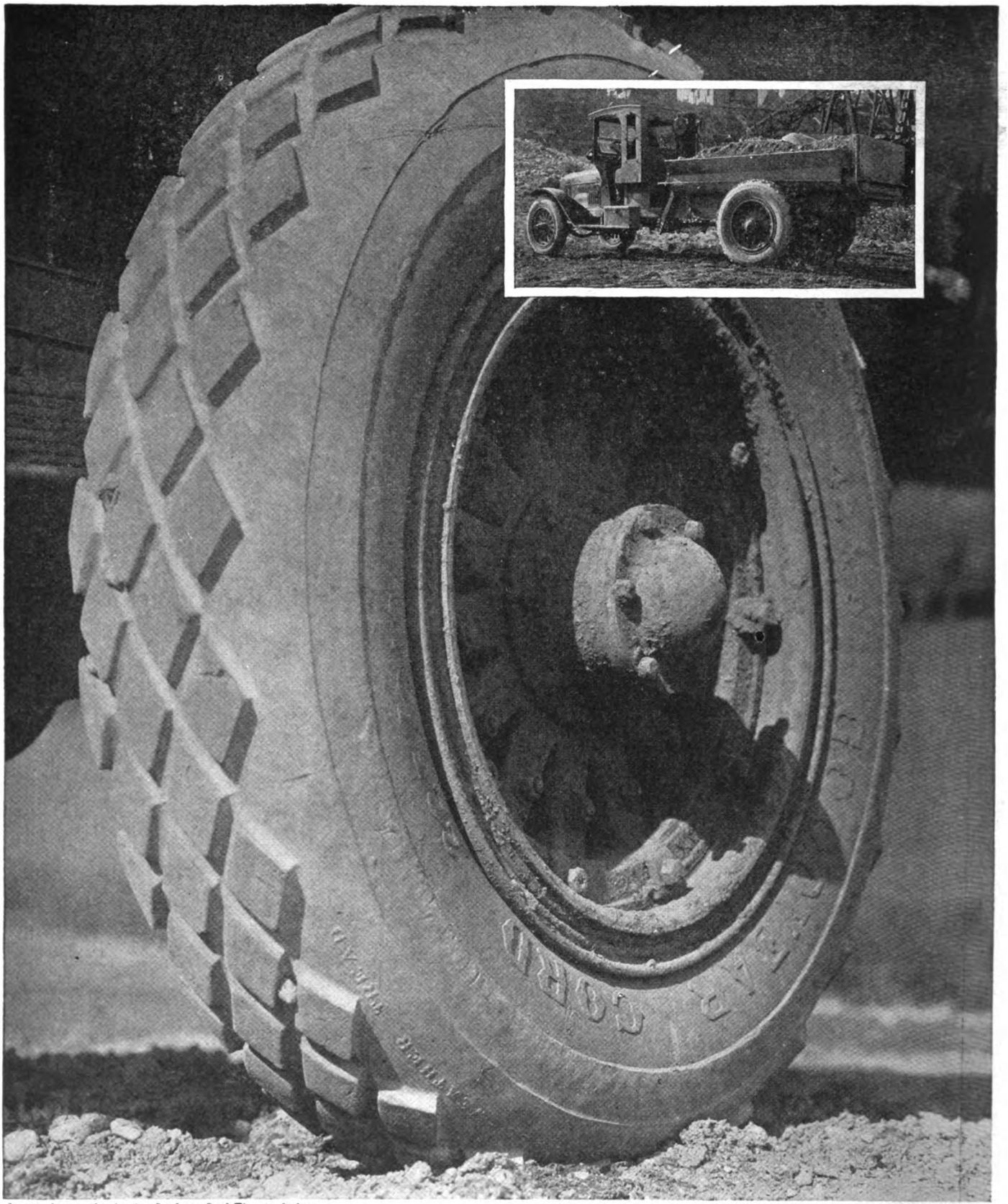

Actual photographs showing Goodyear Cord Tires in the heavy hauling service of W. S. Devenwater, Grand Rapids, Michigan

Copyright 1920, by The Goodyear Tire & Rubber Co.

GOODYEAR

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Truckability—and Sales

"IN hauling yardage on contract my truck on Goodyear Cord Tires has made six to eight more round trips, of ten miles each, per day than any solid-tired truck on the same work. During a recent rainy spell my truck on Goodyear Cords was the only one hauling gravel to a mixer — the solid-tired trucks were stopped by soft going. This means money to me."— W. S. Devenwater, Contract Hauling, Grand Rapids, Michigan

THIS report reflects that tremendous country-wide experience which has demonstrated that the Goodyear pneumatic truck tires completely remove the handicaps of hauling on solid tires.

In pointing to the benefits of pneumatic traction, cushioning and nimbleness, it particularly reflects the vital results of Goodyear Cord construction, originated by Goodyear several years ago.

Goodyear Cord construction has made possible that decisive combination of resilience and toughness which, in turn, has made pneumatics entirely practical for heavy duty.

It is this construction which has furnished the basis of Goodyear's development of Goodyear Cord Tires for trucks and of Goodyear's establishment of pioneer motor truck lines running on these tires.

It is this construction, therefore, which has opened a wider sales field for the motor truck dealer by opening a wider field of usefulness for the motor truck.

The operating and cost data of trucks hauling on pneumatics now offer a powerful selling aid to motor truck dealers and can be obtained by writing to The Goodyear Tire & Rubber Company, at Akron, Ohio.

CORD TIRES

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Autocars solve problem for big New England grocery house

S. S. Pierce Company, Importers and Grocers, of Boston, are steadily increasing their fleet of Autocar Motor Trucks to care for the spreading out of their delivery territory because of the movement of population into the suburbs.

They bought their first Autocar seven years ago. Today they own thirty-five.

The business of the S. S. Pierce Company has greatly increased during the past year, showing among other things, that the public appreciates reliable delivery service.

Chassis (1½-2 ton)
$2300 97-inch Wheelbase
$2400 120-inch Wheelbase

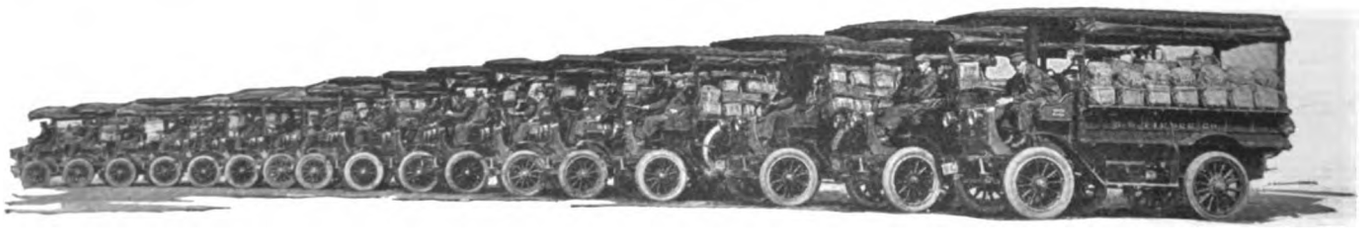
THE AUTOCAR COMPANY, *Ardmore, Pa.* Established 1897

The Autocar Sales and Service Company

New York	Boston	Philadelphia	Chicago	Pittsburgh	San Francisco
Brooklyn	Providence	Allentown	St. Louis	Los Angeles	San Diego
Bronx	Worcester	Wilmington	Baltimore	Stockton	Sacramento
Newark	New Haven	Atlantic City	Washington	Oakland	Fresno

Represented by these Factory Branches, with Dealers in other cities

Autocar



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POWER WAGON

Vol. XXIV. CHICAGO, MARCH, 1920. No. 184

Good Roads' Wail Guides 27,000 Trucks to States

ARMY MACHINES TO FIGHT MUD TRAILS

WASHINGTON, D. C., Feb. 25.—The fire that was started, figuratively speaking, under the War Department has begotten the intended results and by the time this issue reaches readers virtually all the army motor trucks assigned to the highway departments of the several states will be in the hands of the road builders or "on the way." The distribution of this equipment, aggregating some 27,000 motor vehicles, should make it possible to attain a "flying start" on road work in all parts of the country this spring. The disposition of the surplus tractors, dump cars, steam shovels and other aids to road building that remain in the hands of the military authorities remains to be determined.

A point on which there has been anxious inquiry of late is whether, under the plan

(*Continued on page 19.*)

Major General Leonard Wood Emphasizes Maintenance of Roads.

Because of his military experience, Major General Wood favors a comprehensive highway plan, and emphasizes maintenance and the fact that roads can be commercial and military at the same time. "It is especially important that we should provide for continuous maintenance; in other words, roads should always be kept in good condition for service and never allowed to reach the stage when general repair is necessary.

"You may feel that undue emphasis has been laid upon the military road but in considering this project the fact must be borne in mind that, while these roads are vitally important as a possible military necessity, they will serve every commercial purpose."

New Commerce Distributer Contracts for Over $6,000,000 of Trucks

At the banquet of the mid-west distributers of Commerce motor trucks at the Congress Hotel during the 20th Annual Automobile Show, George D. Wilcox, director of sales and advertising, announced that the Commerce Motor Car Company would be forced to add $100 to the Commerce list prices, effective February 16, 1920. Commerce distributers were present from Chicago, Denver, Omaha, Peoria, Hastings, Nebraska, Des Moines, Milwaukee, Cleveland, Waterloo, Worcester, St. Louis, Louisville, Dayton.

During the Chicago show Mr. Wilcox closed a distributing contract with H. J. Dougherty, former Republic motor truck dealer at Kansas City, which totaled over $6,000,000. Mr. Dougherty, who is reputed to be one of the largest distributers for motor trucks in the country, will handle Commerce product in Kansas and Oklahoma and the contributory territory from Kansas City in Missouri and Arkansas. The transactions involves the absorption by Mr. Dougherty of the present Kansas City Commerce distributer, The Gateway Motor Truck Company.

H. C. L. Hits Road Costs

The price of road building in Illinois has increased from an average of $32,000 a mile to between $38,000 and $40,000 a mile, according to bids which were opened by the state division of highways to-day. As a result the department of public works and buildings soon will decide whether to carry out or cancel the road building program this year. Only ten contractors submitted bids, and only one was within the estimate sent out by the state.

Theodore Douglas, President Duplex Governor, Dies at New York Home

Theodore Douglas, consulting engineer and president of the Duplex Engine Governor Company, Inc., died on January 21, 1920. He was the inventor of the Duplex governor, one of the products manufactured by his company. During the past seven years his activities were confined to the Duplex Engine Governor Company, and he was largely responsible for the commercial and engineering success of the company's product. Prior to his connection with the Duplex Engine Governor Company, Mr. Douglas served as president of the Hudson Equipment Company. In his career as consulting engineer he was engaged in many public utilities problems relating to city railway transportation, and while on this work designed various types of subway cars. Mr. Douglas was originally a mining engineer and traveled extensively in Europe, Africa, Central America and the United States for different mining interests. He also spent three years in Italy in archaeological research work. He was a graduate (1894) of Yale and was connected with many prominent engineering and educational societies throughout the country.

Standard Parts and Eaton Axle Company in Merger

CHRISTIAN GIRL SUCCEEDED BY J. O. EATON

Plans have been announced for the consummation of a $25,000,000 merger of axle and spring plants in Cleveland. The companies involved are the Eaton Axle Company and the Standard Parts Company, the consolidation of which will give Cleveland what is said to be the largest company manufacturing axles, springs, bearings and rims in the country.

Negotiations which have been known to be under way for several months are closed, it is announced by Cyrus S. Eaton of Otis & Company. Concerning the deal Mr. Eaton said:

"J. O. Eaton, president of the Eaton Axle Company, has agreed to accept the position of president and general manager

(*Continued on page 24.*)

Hydraulic Steel Consolidates

The Hydraulic Pressed Steel Company announces the consolidation of all its interests under the name of The Hydraulic Steel Company of Cleveland. The individual plants will be known as follows: The Hydraulic Pressed Steel Company, of The Hydraulic Steel Company, Cleveland; The Hydraulic Steelcraft Company, of The Hydraulic Steel Company, Cleveland; The Cleveland Welding & Manufacturing Company, of The Hydraulic Steel Company, Cleveland; The Canton Sheet Steel Company, of The Hydraulic Steel Company, Canton. The executive offices of the company are in the Illuminating Building, Cleveland, Ohio, with branch offices in New York, Chicago and Detroit.

Claims Lead in Axles

The Wisconsin Parts Company, of Oshkosh, Wisconsin, is now the largest independent exclusive builder of motor truck rear axles, according to information given out following the recent annual meeting of the stockholders. Eighteen motor truck companies use the Wisconsin axle on fifty-two different models. The present board of directors of the company consisting of W. F. Rockwell, president and general manager; J. H. Wall, vice president; E. J. Dempsey, secretary; Louis Schriber, treasurer, and J. G. Morris, was re-elected for the coming year.

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Fifty Thousand Farmers Owners of Motor Trucks

DEPARTMENT OF AGRICULTURE ISSUES REPORT

At least 50,000 farmers in the United States own motor trucks which they use on their farms. This is shown by a preliminary survey of the ownership and use of motor trucks by farmers undertaken by the Office of Farm Management and the Bureau of Crop Estimates of the United States Department of Agriculture. The data secured by this inquiry answer many questions which have been asked repeatedly in recent years regarding the extent to which motor vehicles are used for farm hauling.

The figures on which totals for the nation and the several states are based were secured from approximately 35,000 selected crop reporters of the Bureau of Crop Estimates. These coöperators were asked to report the names and addresses of farmers they knew who own motor trucks for farm use. Pleasure cars and trailers for use with pleasure cars were excluded, and the reporters were asked not to take account of motor trucks which are used primarily for general custom hauling, or on regularly established routes.

This survey can scarcely be considered a complete census for it is probable that in some localities the crop reporters were not acquainted with all the motor truck owners but it is certain that a very large per centum have been listed. It is believed that in no state were less than 75 per centum of the motor trucks reported. If not complete in every respect, the figures show the relative distribution very satisfactorily.

The exact number of motor trucks reported is 49,195, divided among the states as follows: Alabama, 847; Arizona, 95; Arkansas, 721; California, 1,019; Colorado, 804; Connecticut, 357; Delaware, 100; Florida, 380; Georgia, 1,808; Idaho, 309; Illinois, 2,261; Indiana, 1,548; Iowa, 2,773; Kansas, 1,732; Kentucky, 818; Louisiana, 310; Maine, 435; Maryland, 596; Massachusetts, 661; Michigan, 1,636; Minnesota, 1,255; Mississippi, 957; Missouri, 2,065; Montana, 359; Nebraska, 2,739; Nevada, 41; New Hampshire, 283; New Jersey, 862; New Mexico, 104; New York, 3,171; North Carolina, 1,450; North Dakota, 501; Ohio, 2,261; Oklahoma, 723; Oregon, 369; Pennsylvania, 2,760; Rhode Island, 152; South Carolina, 1,190; South Dakota, 1,708; Tennessee, 978; Texas, 1,668; Utah, 173; Vermont, 282; Virginia, 1,128; Washington, 682; West Virginia, 465; Wisconsin, 1,465; Wyoming, 174.

Crop Value is 14 Billions

The value of crops produced in the United States this year is nearly three times greater than the average annual value during the five years preceding the outbreak of the European war, according to the report of the Secretary of Agriculture. "On the basis of the prices that have recently prevailed," says the secretary, "the total value of all crops produced in 1919 is $15,873,000,000 compared with $14,222,000,000 for 1918. These values represent gross productions, and not net returns to the producer. The value of live stock on the farms in 1919 was $8,830,000,000, compared with $8,284,000,000 in 1918.

"This increased financial showing does not mean that the nation is better off to that extent, or that its real wealth has advanced in that proportion. The increased values, however, do reveal that the monetary returns to the farmer have increased proportionally with those of other groups of producers in the nation, and that their purchasing power has kept pace in the rising scale of prices.

Lincoln Way Cities Fight Change Placing Chicago on Main Route

A suggestion that the route of the Lincoln Highway be changed so that it will traverse Chicago instead of Joliet and Will County is being bitterly fought by the various counties in Indiana and northern Illinois. Chicago Heights, Joliet and Aurora are the three principal cities affected and will strongly oppose any change in the present routing. A committee headed by Congressman Ira C. Copley has charge of the opposition. It will be maintained that Chicago's place with relation to the Lincoln Highway, should be that of a sidetrack off the main thoroughfare. Such motorists as may desire can make the side trip to the metropolis, but it is asserted that the bulk of the traffic should avoid the congested city.

It has been estimated that 100,000 motor car tourists used the Lincoln Highway during 1919. Of these, 10,000 made the complete tour to the Pacific Coast. It has been computed that these tourists used 4,600,000 gallons of gasolene, 230,000 gallons of lubricating oil, and purchased 9,200 sets of tires, involving a total expenditure of $2,500,000. The value of this highway to the dealers in supplies along the route can thus be partly realized.

Motor Truck Parts

Illustrated descriptions of parts and equipment for motor trucks form a very important part of the Reference Text Section of the 1920 edition of the POWER WAGON REFERENCE BOOK, which is now being distributed by the publishers. Leading examples of parts, such as dead and steering axles, bevel-gear axles, internal-gear axles, worm-gear axles, engines, transmissions, carbureters, magnetos, ball-bearings, roller-bearings, etc., are described and illustrated, and equipment, such as tires, carbureters, magnetos, etc., are treated in a similar way. In the case of stock parts such as axles, transmissions and engines, specifications are also given.

Plans for 20,000 Trucks

Based on the dealer inquiries at the national shows the schedule of the General Motors Truck Company, calling for 20,000 machines this year, is not going to be extravagant. In fact, indications are that even greater production will have to come from the plant at Pontiac to supply the trade.

Machines Save 17,000 Head of Starving Cattle

RUSH FOOD THROUGH MILES OF SNOW

Heroic measures resorted to in Wyoming cattle country and in which motor trucks played the principal role, have been rewarded by the saving of 17,000 head of snow-bound cattle from what seemed certain death by starvation. The value of the cattle saved to their owners by the motor trucks is approximately a million and a half dollars.

Because of the unusually heavy snowstorms this winter the cattle found it impossible to burrow for food, and a storm which swept that section several weeks ago made the situation desperate. Efforts to carry food across the snow-bound ranges to the cattle proved futile, it being impossible for horse-drawn vehicles to make any progress.

Finally bankers and business men at Lawton, Wyoming, formed a pool of $200,000 with which to purchase a large quantity of food and the governor of Wyoming was appealed to by them for assistance. In response to the appeal the governor authorized F. P. Allen, superintendent of the Wyoming State Highway Motor Transport, to place in rescue service 12 motor trucks. The machines were loaded with 2 tons of baled alfalfa and a determined "drive" was made for the imperiled cattle.

The storm had left from 18 inches to 3 feet of snow which had formed drifts from 6 to 8 feet in depth. Sheepmen from the surrounding country rounded up 100 head of horses and drove them into drifts ahead of the cavalcade of motor trucks. With the opening thus made the power wagons plunged into the heavy banks of snow and the struggle to reach the ranges was begun.

Those who participated in the rescue were amazed at the ability of the motor trucks to progress in the face of conditions that had heretofore proved insurmountable. The work of rescue occupied a number of days, and throughout the ordeal the machines performed feats which those in the party had believed impossible.

Truck Use in Leading Trades

A section of more than 100 pages in the 1920 edition of the POWER WAGON REFERENCE BOOK is devoted to studies of the use of motor trucks in various leading industries. The methods employed by well-known operators are treated and are accompanied by the signed statements of owners telling of their experiences with motor haulage. All but a few of the studies include elaborate tabular data, showing the number of motor trucks in use, their value and distribution, and the number of owners. An additional feature of value will be found in the figures showing the number of concerns engaged in each industry treated. Other tables show the yearly gowth in the use of machines, and the number and percentages of each size employed in 1919.

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N. A. C. C. to Occupy New Quarters After May 1st

GROWTH OF INDUSTRY CAUSE OF MOVE

After twenty years in one building, which the automobile industry has now outgrown, the National Automobile Chamber of Commerce will move on May 1 from 7 East 42nd Street, which has been to the automobile industry what 26 Broadway has been to the oil industry, to the new Marlin-Rockwell Building at Madison Avenue and 46th Street.

The 14th and 15th floors of the new building will be occupied, the building plans providing not alone for ample room for the new departments and rapidly expanding work of the chamber, but for a board room 28 by 53 feet to seat 225 people. This room will be offered to other automobile associations requiring large meeting places, so that it will be a central headquarters for all automobile affairs.

On the 14th floor of the new building, the architect's plans show provision for the executive officials of the chamber and the active departments, include foreign trade, legislative, traffic, motor truck, rural motor express, service, publicity, statistical, show, highways, patents and others. On the floor above will be located the board room containing 1,484 square feet of vault design, with an equipment that will make it the most representative meeting room of any trade association in the country.

The patents library will have 140 feet of bookcases which are in constant use by the patent attorneys and librarians. The N. A. C. C. library was built up at a big expense during the past five years, with a view of keeping the patent situation clear. It has filed and card indexed copies of more than 130,000 patents affecting automobiles, directly and indirectly which were selected from the Patent Office at Washington and brought to New York; files of every automobile or trade paper published during the past 25 years, either here or in foreign countries, and practically every catalog, hand book or instruction book issued by automobile manufacturers since 1900, besides a complete library of all books that have been issued on the internal combustion engine. These books have all been read and their contents, as affecting patents, listed on some 54,000 cards under various headings. By consulting these records makers are enabled to avoid infringing on patents, while engineers are saved many months of experimenting on work in hand because of the information obtainable from the Library as to the results of past experiments.

The first room of the old quarters at 7 East 42nd Street, was taken in 1900 by S. T. Davis, Jr., president of the Locomobile Company of America, and who was the first president of the National Association of Automobile Manufacturers which had eight members. This organization dissolved in 1912. In 1903 there was formed the Association of Licensed Automobile Manufacturers, which occupied space in the same building.

The passing away of the A. L. A. M. in 1910 to be succeeded by the Automobile Board of Trade, and later the combination of the latter with the National Association of Automobile Manufacturers, brought about the National Automobile Chamber of Commerce in 1912 which has taken over all the 10th floor, a part of the 11th floor and built a bridge across to the 10th floor of the Annex, where its patents department has been housed. It now becomes necessary to have more room for its present work and for the many new activities scheduled during the next year. Charles Clifton has been president of the association since its inception.

Good Roads' Wail Guides

(*Continued from page 17.*)

now being followed, complete title to the alloted road equipment is vested in the several states. Unfortunately, it is not possible at this juncture to vest title in the states. Under the present law, it is prescribed that the motor trucks must be used on roads constructed in whole or in part by federal aid. This is in some respects a hampering restriction. However, there is pending in congress a measure whereby complete title would be given to the several states.

The leeway that complete title would give is desirable because a number of the states would, if given a free hand, transfer a portion of the equipment to the counties for needed road work. Not all of the equipment can be used to advantage by state highway departments whereas the excess motor trucks are really sorely needed for local road construction in the counties. In some states where the federal aid road work is carried on through the counties this complication over the assignment of motor trucks has not developed but in other states where the federal aid highway work is done solely and directly by the state it has been held to be unlawful for a State Highway Department to release any of the army motor trucks to the counties. This is the situation in states such as Illinois.

In this connection it is interesting to note that federal specialists on highway improvement are urging the maximum use everywhere of motor trucks and other efficient mechanical aids to road building on the theory that just in proportion as power road builders are requisitioned will there be less drain on the human labor which is so acutely needed on the farms and of which there is such a shortage in many localities. Just in proportion as motor trucks are employed for fetching and carrying, etc., is there relaxation of the demand for unskilled labor on the roads.

Makes 185-mile Test Run

In order to test the possibilities of a ship by truck movement between Peoria, Illinois, and Chicago, Illinois, a distance of 185 miles, a truck carrying 100 Firestone tires was started out and made the run in eleven hours. Test runs to other cities are planned and the cost as compared with freight or express rates, will be figured.

Blakeslee Says Trucksters Lose Money on All Routes

SAYS LOSSES COME THROUGH DISTRIBUTION

WASHINGTON, D. C., Feb. 20.—While the ultimate outcome is difficult of prediction at this juncture it must be conceded that the interests that are enthusiastic for a maximum use of motor trucks in the postal service have been making, at this session of congress, every effort to persuade the national law-makers that, whatever other economies may be necessary, the motor truck program should go forward. Officials of the Post Office Department are desirous that congress, if it can not see its way clear to increase the expense account for this enterprise at least continue the appropriation of $300,000 a year for experimental motor truck service on country express and freighting routes. While admitting some errors in the figures given out in the past as to the income from postal motor truck service, the officials have, under cross examination by congressional committees stoutly defended the benefits conferred upon the urban consuming public by the motor trucks that have brought farm products direct to city dwellers.

At a recent conference with members of the Post Office Committee of the United States House of Representatives, Fourth Assistant Postmaster General James I. Blakeslee had spirited interchange with some of the members of the committee on the question of the status of the motor truck express and freighting services operated in various parts of the country by private individuals. The Post Office Department official precipitated the debate when he made the assertion, with reference to these private enterprises, "There is not one of them in the country that is paying." The Fourth Assistant Postmaster General went on to make it clear that he spoke not merely as a postal official but as a member of the Highway Transport Committee, which latter organization had made, he explained, an investigation of some 550 routes operated by individuals, firms and corporations.

Congressman Steenerson, chairman of the Post Office Committee was inclined to take issue with the departmental official over this gloomy picture of private motor trucking enterprises. Said the chairman "You may know everything down here in Washington, but I had a man specially investigate some of these routes up in Minnesota that are maintained with no bonus from the government and I know that they are operating at a profit." Mr. Blakeslee came back with an interesting theory, as follows: "It is a common sense proposition that from the point of dispatch to the point of destination a motor-truck route will pay, but when the man who owns such a motor-truck route is compelled to make his distribution of the articles he hauls in the community at destination he loses every cent that he makes on the operation between termini. The distribution is the thing that kills every motor truck concern engaged in motor truck hauling."

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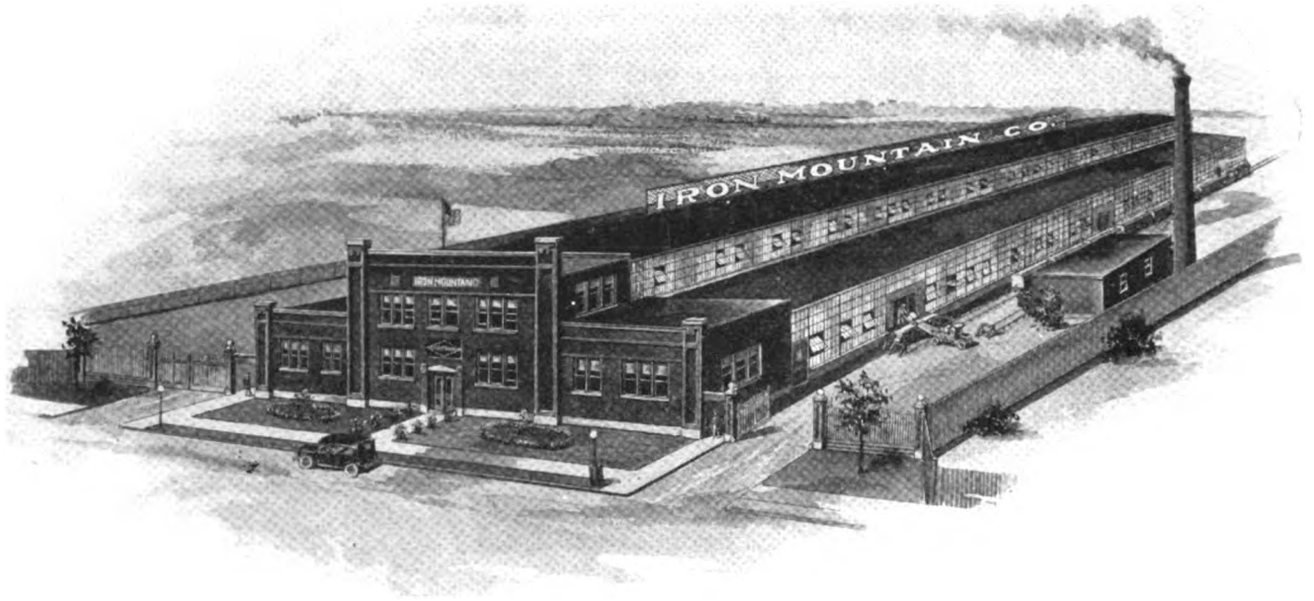

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An exponent of the most enlightened thought and practice of the motor truck industry.

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Highway Economy

MOTOR transport on the highways is often compared to transport on the railways and the analogy is complete in many respects. There is, however, this essential difference: Those who own railway rolling-stock also own and control the rights-of-way; those who own highway vehicles do not own and do not control the roadways over which they operate. Obvious and important as this difference is, it is frequently overlooked, especially as to its consequences and particularly by those who are loudest in their clamor for improvement in highway conditions. Yet, despite the outcry, there are few indications that much effort is being made to foster a relationship that might relieve them. There is no real coöperation between those who use the roads and those who build and maintain them.

Perhaps no one would care to advocate that the ownership of roadways and road vehicles should be merged in one group, as in the case of our railways, since to do so would be to run counter to all settled convictions respecting public and private ownership and to invite the most hearty opposition from highway officials. Similar results might well be attained by other means, if the situation were properly viewed and properly understood. But the viewing and the understanding, however clear or cloudy, imperfect or complete, should not be entrusted to only one of the two groups chiefly interested, for this very policy has been responsible for the conditions that now prevail. As a result, few, if any, of our highways are suited to the traffic they bear or may be expected to bear within the next decade, since it is hardly to be expected that one group, interested in minimizing the costs of highway construction and maintenance, will display much sympathy for another group, whose demands for lower transport costs seem to involve increased highway expenditures.

In defense of highway engineers, who may often appear to obstruct the development of new and better roads and streets, it should be said that they have only a very limited power to exercise their judgment as to what is most economic, while in many cases their judgment is but poorly fortified by facts due to their lack of data as to the volume of traffic and the cost of motor transport. Such information can only be supplied by investigation, by test, and by inquiry among those who operate motor vehicles and know their cost. At present little is known regarding the effect of various roadway surfaces on such items of motor transport costs as fuel consumption, tire wear, vehicle depreciation, speed, etc., yet there are no more important factors in motor wagon economy than these.

Motor truck owners' associations have great opportunities for guiding highway engineers to a better understanding of the problems and costs of motor haulage and for helping to clothe them with the power to utilize that knowledge in the improvement of highway construction. In collaboration with motor truck manufacturers and dealers they could organize tests which would disclose at least some of the facts so badly needed, while their present cost records would supply a basis on which investigation could proceed. Until something of this kind is undertaken the analogy between highway and railway transportation will be more rhetorical than actual and highway transport economy will remain a goal unlikely of attainment.

Hostility to the Truck

MILD tempered folk in the motor truck industry are prone to believe that no active measures are required in order to overcome or counteract the propaganda of the fraternity which lives out of the breeding, labor and equipment of draft-animals. These amiable people take the high ground that a hot defense of mechanical road haulage will but provoke antagonism to it. They hope to conquer without striking a blow.

If there is one fact in the history of motor truck development more shiningly conspicuous than another it is that the machine and the draft-animal are in deadly opposition. While waiting for the final decision as to which is best fitted for supremacy, the two temporarily may be allied in a common work service, but in the end one alone will survive. It is the unalterable economic law that whatever is wasteful must disappear. The draft horse is a waster of high degree in these days of applied power and human invention. The Almighty never designed the brute for traction. It is probable that originally it was created for food. Often we still find it so regarded. But the cunning and greed of man converted the horse into a beast of burden, and for this impiety the world is still paying penalty.

The motor truck was invented for the specific purpose of displacing the draft-animal. It was not conceived as supplementary to an inefficient existing transportation agent. Many years ago it was well understood that in order to make headway in mechanical haulage it would be necessary to exhibit a reasoned hostility to horse haulage.

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From the beginning the conflict between the two was inevitable. In the very nature of things, therefore, it must be continued until one or the other is left undisputed victor of the ground.

In such a situation a fiercely militant spirit is absolutely necessary to accomplish the object in view. Militant salesmanship, militant propaganda, militant engineering—all these are required in ever increasing force and volume if the struggle is not to be unduly protracted. Passive acceptance of conditions as they are, accompanied by a false tenderness of feeling for the horse and his professional following, will most assuredly cause a retardation of motor truck application.

Were we dealing with a generous and chivalrous foe, there might be some excuse for being conventionally polite and restrained. But in the heat of controversy the enemy exhibits such unparalleled malignity and mendacity as clearly to convey the warning that the death grapple is imminent. The forces behind the horse are massed and on the offensive. They should be met in the open and signally defeated. Pussyfooting tactics will not deliver a victory.

If there is any doubt touching the commercial attitude of the defenders of the draft-animal toward the motor truck, let this fragment from a recent issue of the *Horse Review* dispel it:

A Few Cold Facts.

"'Bull' prominent at Horse Feed," reads a title in Power Wagon, January issue. What do you suppose underlies the malignant hostility of these greasy mechanics to the horse? Is it because of their flat failure to produce a draft work unit which can compete with the horse economically within the working area of the horse?

Trucks have quit cold on milk, laundry, bakery and ice routes. They are done for at freight depots and fast being displaced for all heavy work. These fancy dumping devices which were discarded by the railroads thirty years ago certainly can't work any better on four wheels than they did on eight. A horse has them "cheated" on any haul up to 6 miles from base, and they can't catch him, dollar for dollar, hour for hour, up to 12 miles. Is it because the horse can't be buried under an avalanche of lies?

There seems to be only one objection to trucks. This objection is that they increase a merchant's expense with no increase of income. After fiddling for ten years they can't make an iron horse that has less than 11,000 parts, no two of them interchangeable, and each one as easily broken as a glass bar spoon. They killed more people in the U. S. last year than there were American soldiers shot in the war in France. They are more dangerous to the community than any other known plague.

They harp on progress and speed. Where do they get that noise? There's no music in it. There's no literature, no philosophy, no religion, no history, no poetry, no diplomacy, no art, no science that hinges on getting over the ground fast. There is no educational value in the discussion of how to mend this or that broken bit of iron.

All the daily tonnage handled in Chicago could be moved by horse-drawn vehicles with 100,000 horse's power. Allowing the auto truck men their own claims, and there is 455,980 horse-power tied up in work vehicles in addition to the 42,000 real horses we have. That means that it takes 15½ horse-power to do the work of a team of horses. One horse-power was originally calculated to be just a shade cheaper than one horse's power. Is this the reason it costs so much more to do a job with a truck than it does to do the same work with horses?

Of course this is tommyrot. But even as tommyrot it has its admirers and believers. For this reason it is worth while to prove it to be as false as it is scurrilous.

Uniformity in Law

UNLESS some intelligent effort is made to standardize opinion with respect to what are proper rules for the regulation of motor truck traffic, we must not complain if the industry finds itself harassed here and there by the narrowing restrictions of legislative enactments. Such a condition has existed for a long time, and during recent years, since there has been a noticeable tendency to increase loads and speeds, the oppression has often been acute. Indeed, in some states there is the lurking chance that motor haulage may in effect be prohibited by the imposition of unwarrantably high registration fees.

Of course, much of this confusion and reactionary obstruction might be overcome through the establishment of some standards by which motor truck speeds, loads, dimensions, and the like could be judged. Yet the prospect of such a step seems rather visionary. Laws are regularly enacted without full knowledge of conditions, and are more often designed to prevent certain flagrant abuses than to promote a generally safe and encouraging situation. Each state legislature and city council is content to base its action on limited experience, which is made to appear all-important under the heat of sudden reaction. It seldom happens that the laws of other states are scrutinized or the experience of other state highway engineers invited. The need for such a penetrating investigation is easily swept aside with the assertion that laws must be made to fit local conditions and that outside testimony is irrelevant.

This excuse seems more plausible than it may really prove to be on examination, but the fact remains that it is usually a convincing argument in opposition to the sensible plea made for uniformity. The prejudice which usually fights against all efforts at standardization must be broken down before the industry can feel at all secure from the caprice of legislating bodies. Until this is accomplished motor truck design, sale, application, use and performance must remain hampered by the conflicting and unreconcilable opinions of highway engineers and law-makers as disclosed in present and proposed legislation.

Only when the proper limitations in speed, weight and size are definitely established by the intelligent coöperation of engineers representing the industry and public highway departments and business men representing the industry and the motor truck owners will designers and operators be able to make the most of their opportunities. Most of these are lying fallow, while indifference and inexpertness toy with the future of a great commercial movement, and they will so continue, we suspect, just so long as uniformity in traffic legislation is not persistently and intelligently striven for.

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53,000,000 Square Yards Were Placed Under Contract During 1919—

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Uncle Sam to Pound Roads in Tests of Materials

IS IN SEARCH OF BEST TRUCK HIGHWAYS

WASHINGTON, D. C., Feb. 24.—Encouraged by the findings already attained, the Department of Agriculture is planning to push to new lengths its unique investigation of "the blow that is struck by a moving motor truck wheel" under all sorts of conditions. Indeed so ambitious are the officials to broaden the scope of the "impact" investigations referred to in previous numbers of this journal that congress is being importuned to increase by $30,000 the annual budget from which is drawn funds for this sort of pioneering.

One of the most interesting phases of the investigation of the effect of the action of heavy wheels on road surfaces is found in the ingenious manner in which the federal specialists have accomplished what they term "accelerated tests." The pith of the idea of an accelerated test is to produce in a very limited time the wearing effect or the service trial that would, normally, only be observable after a long period of time. By this speeding up process, and using motor truck wheels each of which weighs one thousand pounds, the investigators have "broken up" road surfaces which have, up to this time, been supposed to represent very good construction and the defects of which would not have been revealed until some day in the more or less distant future had it not been for this adventure in scientific foresight.

It may not be telling tales out of school to say that Uncle Sam's motor truck traffic inquisitors have, as a result of the tests thus far conducted, about reached the conclusion that the failures of concrete roads that have broken down under motor truck traffic have resulted rather from deficiencies of drainage, etc., than through fault of the road surface itself. The whole trend of the disclosures points to the problems of the subgrade as the tender spot in the construction of roads for motor truck traffic. However, with the best of pre-war roads—for example a high class brick surface on a 4-inch concrete base—going to pieces under motor truck traffic it is patent to the investigators that modern motor truck traffic necessitates a more efficient type of construction than has heretofore been introduced to any extent.

"Money Belt" Motor Truck Tour Prospectus Is Out for June Run

The prospectus of the first national Motor Truck Reliability Contest under A. A. A. sanction, promoted by the *Omaha Bee* (on the Lincoln Highway), has just been sent out. It states that the start will be made early in June, that entries will be for pneumatic tired motor trucks only and that the object of the run will be to exploit motor trucks in the "Great Money Belt of the United States." The run is expected to demonstrate motor truck reliability and to bring to the attention of the state, county and municipal authorities the crying need for improved highways as a logical means of linking the farm and the city. The *Omaha Bee* has offered a handsome trophy.

The run as tentatively planned will start from Omaha and follow the Lincoln Highway as far west as Cheyenne Wyoming, from that point turning south to Denver, Pueblo, and La Junta, Colorado; then east by way of Dodge City, Hutchinson and Emporia to Kansas City; thence north by way of St. Joseph, Mo., to Des Moines, Iowa. The route of the run will cross the Lincoln Highway at Boone, Iowa, go north to Ft. Dodge, Iowa, and Fairmount, Minn., thence west to Sioux Falls, South Dakota, and south by way of Sioux City, Iowa, to the starting point at Omaha, covering a total distance of between 2,500 and 3,000 miles and requiring four weeks on the road.

Standard Parts Merger

(*Continued from page 17.*)

of the Standard Parts Company, with which the new Eaton Axle Company has been consolidated. The latter company will, however, retain its corporate identity, Mr. Eaton remaining president and general manager.

"The output of the new combination will be very large, embracing within its scope the manufacture of bearings, springs, axles, rims, forgings and other parts. Tending as it does to make the industry self-contained, this combination will prove of great advantage to each of the large companies concerned."

The general policy of the new management will be to try to center in Cleveland and vicinity as many as possible of the various industries comprising the combination. A syndicate of financial interests, representing the largest banking institutions of Cleveland will finance the company in a broad program of expansion.

The Eaton Axle Company plant, now in the course of construction, will contain 600,000 square feet of floor space area on a 15-acre plot. The foundation has been completed and President Eaton declared it will be ready for business by May 1. The consolidated companies are expected to do a business of about $60,000,000 in 1921.

The Standard Parts Company comprises the Standard Welding Company, Perfection Spring Company, and the American Ball Bearing Company of Cleveland; the Western Spring & Axle Company of Cincinnati; the Bock Bearing Company of Toledo, as well as plants at Flint and Pontiac, Michigan; Connersville, Indiana; Wheeling and Canton.

Capital of the new company will, in all probability, be about $35,000,000.

With the construction of the Fisher Body Company soon to be started in the growing industrial section of the northeastern part of the city and with these plants combined, Cleveland's position as the automobile center of the Union is given a material improvement.

Requires 5 Years to Make Horse Finished Product

ONE REASON FOR DECREASING NUMBERS

In an address before the Horse Publicity Association Dr. George M. Rommel, United States Department of Agriculture, gave an answer to the question of why horse breeding has shown a big decrease. In part he said:

"There is no doubt that there has been a marked decline in horse breeding in the United States since 1915, a decline which has been estimated at as much as 40 per centum in the breeding of draft horses, and certainly 50 per centum, and more, probably 55 per centum, in the breeding of horses of the lighter type. Yet a good horse sells for just as much money, or a little more money to-day than it did five years ago, and if you talk to the dealers in saddle horses in Kentucky, they will tell you without exception that they have more demand for good saddle horses than they can fill, they can not find enough good saddle horses to meet the demands on their books.

"Now that is a sort of anomalous situation until you stop to think why, and it is simply this: Horses are worth as much or a little more to-day than they were before the war, but other farm animals have *doubled* in value, and that is the whole answer. And I will tell you people from New York City right here that you can't ask the farmers of America to do something without being paid for it. They are not going to raise horses, or milk, or corn, or wheat, or anything else for the fun of it. They can't do business that way any more than you people in New York City. They have to make a profit to make it go.

"A farmer can raise 1,500 pounds of pork in nine months, and sell it at present prices at 13c a pound, or for a little less than $200. In nine months he can raise 1,500 pounds of lambs and sell them for more than $200 at their present prices. He can raise 1,500 pounds of beef and sell it at 30 to 36 months at considerably more than $200. If he starts in to raise a horse just to make the money that he can out of the horse, and turns out a 1,500-pound horse in five years, he is lucky if he gets $500. That is the answer. That is the reason why the farmers have stopped breeding horses to a considerable extent."

Christian Girl, present executive of the Standard Parts Company, was active in the merging of the various parts companies into the Standard Parts organization. During the war the company was given a hard blow and recently has suffered a great deal through a four-month strike in the Toledo plant and a brief tie-up in the Perfection Spring plant in Cleveland.

Some idea of the business ahead of these companies is evidenced by the fact that orders ahead of the Standard Parts Company alone now are in excess of $23,000,000.

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Six Sick White Elephants Gum Road Improvement Work in Cracker State

The public works committee of the Fulton County, Georgia, Board of Commissioners has notified the State Highway Department that it would not accept any more army motor trucks and that the six machines now on hand would be returned to the government. This action was taken following a report which showed that the motor trucks were in such bad condition that they were not worth the freight it cost to ship them, and the expense of having them inspected by an expert. The report states that the six motor trucks now on hand have spent most of their time in the repair shops and have given very little service.

Martin-Parry to Enlarge

F. M. Small, president of the Martin-Parry Corporation, issued the following statement:

"The board has approved plans for the doubling of the capacity of the Parry plant at Indianapolis. This will involve only the installation of new machinery and equipment inasmuch as the Parry plant covers fifty acres and includes 650,000 square feet of floor space in its buildings.

"Machinery and equipment for doubling the capacity of the Martin plant at York, Pennsylvania, has already been installed and by April 1 the York plant will be turning out double the production of six months ago. With the increased capacity of both plants the Martin-Parry Corporation will be in a position to produce 100,000 commercial truck bodies yearly. The demand for the company's product will absorb the entire increased capacity of the plants. During the past six months the company's business has increased 50 per cent. In 1919 the two plants did a gross business of $3,500,000. The business for 1920 should approximate $8,000,000.

Co-ordination Among Farmers

A sign of the growing appreciation by farmers of the use of motor traction is emphasized by the fact that recently a largely attended meeting was held in Berwick, England, when it was decided to establish a motor transport system, with Wooler and Berwick as collecting stations, to bring manures, etc., direct from the centers to the farms, to take back farm produce.

Truck Chassis Design

Engineers, body builders and draftsmen will find much valuable information in the 1920 edition of the POWER WAGON REFERENCE BOOK, which has just issued from the press. Chassis lay-out practice is clearly disclosed by more than 100 blueprint reproductions of motor trucks, trailers, and tractors, while the details of general design are given in the very complete tabulated specifications. Lists of makers of complete vehicles, parts and equipment are also included, as well as descriptions, illustrations and specifications of stock parts and equipment.

State Market Officials in National Body

Transportation Committee Endorses Rural Motor Express and Advocates Its Extension; Twenty States in Organization

TO coördinate the work of the various state marketing agencies, to prevent a duplication of effort, to coöperate on problems of general interest in marketing and to promote a better understanding between the various interests engaged in marketing foodstuffs were the objects for which the National Association of State Marketing Officials was formed at a meeting held in New York City, February 7, 1920.

Among the many interesting subjects discussed was that of the rural motor express, introduced by the Transportation Committee. The committee's report suggested "that the various states having organizations devoted to marketing investigate the rural motor express movement in a manner similar to that which the Division of Foods and Markets of the New York State Department of Farms and Markets is now doing and that these various states encourage the movement."

In the discussion which preceded the above suggestion it was stated that the rural motor express functions in two ways. First, as a primary carrier from points of production to points of consumption; secondly, as a secondary carrier from points of production to important railway points so that farm products might be sent to their final destination without delay.

It was pointed out that the motor truck express has certain characteristics which make it the logical short haul transportation agency. Among these characteristics is mobility, for the motor express can operate wherever there is a road. As traffic shifts from one point to another, the unit can be shifted to points of demand with no inconvenience or loss of valuable property, such as rails, depots and franchise. The initial expenditure for a motor express line is small and with proper care has a long period of economic usefulness. Transportation charges, based on operating costs plus a reasonable profit, are more than railroad freight rates, exclusive of hauling charges at points of origin and delivery, and less than railway express. The value of this service extends to both producer and consumer for the producer finds an agency which personally collects and delivers his products, thus giving him more time to devote to his specialty, and divorces the farmer's transportation problem from that of production. To the consumer it brings a larger, fresher and ofttimes cheaper supply of farm products than may be found in markets without this form of service. By decreasing the number of handlings the motor express increases the desirability of the product and therefore market value. Ordinarily a shipment is handled five or six times before it reaches the wholesale market, while with the motor express the number of handlings is usually two. In the handling of most farm products time is an important factor. The motor express offers rapid and direct service.

D. B. Owen, of Virginia, chairman of the Transportation Committee, reports that: "The Committee has found the rural motor express an invaluable aid to producers. It is a means of reducing the cost of living because it eliminates waste, duplication of work and makes profitable the marketing of small quantities of foodstuffs. It is a movement that no state, interested in marketing, can afford to overlook or fail to encourage."

Thirty states have officials who may become executive members. Twenty states have been admitted to membership. The organization as formed has a president, Dr. Eugene H. Porter, Commissioner of the Division of Food and Markets of the New York State Department of Farms and Markets; seven vice presidents, each acting as a chairman of one of the permanent committees; a secretary, L. M. Rhodes, of Florida, and a treasurer, L. G. Foster, of Wisconsin.

The permanent committees are: Organization, Standardization, Coöperative organizations, Market reporting, Interstate relations, Transportation, Legislation.

The states that have joined the association are Arkansas, Florida, Georgia, Illinois, Maine, Maryland, Massachusetts, Nebraska, New Hampshire, New Jersey, New York, Ohio, Oklahoma, Pennsylvania, South Carolina, South Dakota, Vermont, Virginia, West Virginia and Wisconsin. The director of the U. S. Bureau of Markets is also an executive member.

Guide for Body Builders

Elaborate data of great value to motor truck body builders are included in a section of the 1920 edition of the POWER WAGON REFERENCE BOOK devoted to motor truck bodies. In addition to illustrated descriptions of all types of bodies and hoists, there are valuable suggestions on body painting and design. All important chassis dimensions required in the construction of special bodies are given, together with the body weight allowances determined by the various motor truck manufacturers.

Trailer Specifications

Detailed specifications of more than four hundred trailer models are included in a 50-page section devoted to trailers of all types in the 1920 edition of the POWER WAGON REFERENCE BOOK, now being distributed by the publishers. In addition to data of this kind there are given side elevation and plan view blue-prints of 2-wheeled and 4-wheeled trailers, semi-trailers and trailers of the automobile type. These are followed by an exhaustive article treating the design, application and use of trailers in various lines of business.

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Packard Perfects Fuelizer for Low-Quality Gasolene

APPLIANCE ASSURES A CLEAN ENGINE

The woes that beset motors have been gradually increasing as the quality of the fuel on which they were required to run has decreased. Under average running conditions, kerosene splatters about in the cylinders. It removes the film of protecting oil from the walls; some of it collects and burns, turning to carbon that fouls the engine, and the remainder runs down past the pistons and dilutes the lubricating oil in the crankcase.

Engineers have agreed that this condition could be remedied only by providing for complete combustion of the fuel in the cylinders, and the Packard Experimental Laboratories have brought forth a new device called the Fuelizer to adapt Packard engines to the fuels obtainable to-day —and to-morrow. According to Col. J. G. Vincent, vice-president of engineering of the company, the Fuelizer not only assures a clean engine, but it also eliminates all trouble in connection with starting the motor in cold weather. Tests show that a motor equipped with the new device is ready for high gear work on a summer setting of the carbureter within twenty seconds after cranking, regardless of the temperature.

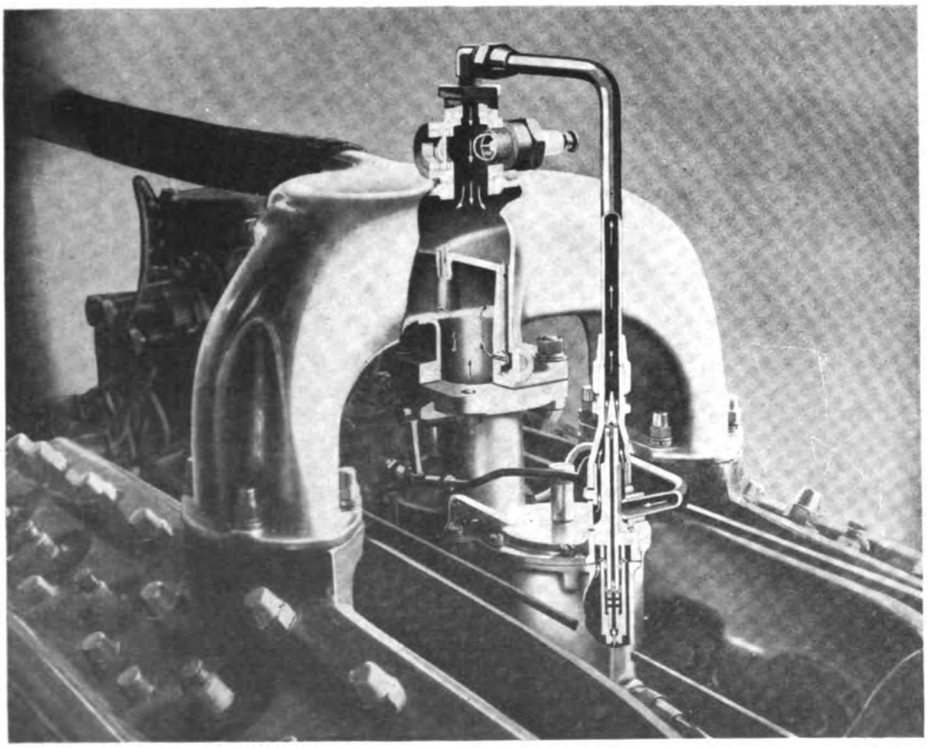
During the past few years automobile manufacturers have spent much time and money trying to meet the threat of decreased quality of gasolene, due to the great expansion of the industry and the consequent drain on the oil reserves of the country. The experiments centered about the idea of heating the charge as it passed into the engine, and the most common device was the exhaust heated intake. This system provided the engine with no heat when it was starting, slight heat when it was idling, and a maximum of heat when the engine least needed it. A complete reversal of this process was the aim of L. M. Woolson, the engineer who developed the Fuelizer.

The Fuelizer, as it has been perfected to become a standard part of the Packard motor cars, gives the maximum heat to the charge when the engine is starting and idling, and drops out of operation when the engine is able to supply its own heat. It gives complete combustion of the fuel in the cylinders, and during the months of test there was not a single instance of engine fouling.

The Fuelizer consists of a small supplementary carbureter and a burning chamber where the gas from the little carbureter is burned. This chamber is situated in the intake manifold. When the gas enters, it is ignited by a regulation spark plug and passes into the fresh charge going from the carbureter to the cylinders. The heat of the burnt gas changes the wet, poorly carbureted mixture to a dry vapor, which explodes with full efficiency when it is touched off by the spark in the cylinder.

The action of the Fuelizer is entirely automatic, without involving a single moving part. When the engine is starting the Fuelizer is in full operation and the heat supplied to the charge becomes less as the throttle is opened. This regulation is provided by an air valve similar in operation to the air valve of the main carbureter.

Through a small Pyrex glass window the operation of the Fuelizer may be seen. A perfect mixture produces a purple flame, a fairly rich mixture produces a bluish-green flame, and an exceedingly rich mixture is indicated by yellow streaks in the flame.



Sectional view of Packard Fuelizer.

Motor Vehicles Per Capita

California is first, Nebraska and South Dakota second and third, and Iowa fourth in automobiles per capita on December 31, 1919, according to a table compiled by the Omaha Chamber of Commerce. The figures were secured direct from the person in charge of automobile registrations in each state. Motor trucks are included with passenge cars, because in most states the two types of vehicles are not separated.

	State.	Automobiles.	Population.	Per capita.
1	California	493,463	3,029,032	6.2
2	Nebraska	189,350	1,284,126	6.8
3	South Dakota	104,628	716,972	6.8
4	Iowa	279,677	2,224,771	7.9
5	Montana	59,312	472,935	7.9
6	Minnesota	259,743	2,312,445	8.8
7	Wyoming	21,371	184,970	8.8
8	Kansas	206,033	1,851,870	8.9
9	Arizona	28,979	263,788	9.1
10	North Dakota	82,585	765,319	9.2
11	Colorado	104,839	988,320	9.4
12	Michigan	325,813	3,094,266	9.4
13	Washington	164,080	1,597,400	9.7
14	Ohio	511,500	5,212,085	10.1
15	Indiana	277,255	2,835,492	10.2
16	Oregon	83,332	861,992	10.3
17	Idaho	42,271	445,176	10.5
18	Wisconsin	236,981	2,527,167	10.6
19	Nevada	9,305	110,738	12.3
20	Connecticut	102,410	1,265,373	12.4
21	Utah	34,749	443,866	12.6
22	Illinois	478,438	6,234,995	13.0
23	Delaware	16,152	215,160	13.4
24	Vermont	26,807	364,946	13.5
25	Texas	331,000	4,515,423	13.6
26	Missouri	244,427	3,429,595	14.0
27	Maryland	95,634	1,373,673	14.3
28	Maine	53,424	777,340	14.6
29	N. Hampshire	30,000	444,429	14.6
30	Massachusetts	247,000	3,775,973	15.2
31	New Jersey	190,873	3,004,194	15.7
32	Rhode Island	38,257	625,865	16.4
33	Florida	55,423	916,185	16.6
34	Pennsylvania	490,337	8,660,042	17.6
35	New York	560,811	10,460,182	18.6
36	Oklahoma	120,147	2,289,855	19.0
37	Georgia	134,826	2,895,841	21.4
38	N. Carolina	111,300	2,434,381	21.9
39	S. Carolina	70,143	1,643,205	23.5
40	Virginia	94,150	2,213,025	23.5
41	New Mexico	18,065	423,649	24.0
42	West Virginia	56,639	1,412,602	24.7
43	Kentucky	90,008	2,394,093	26.6
44	Tennessee	80,422	2,304,629	28.8
45	Arkansas	49,450	1,766,343	36.1
46	Louisiana	51,000	1,856,954	36.4
47	Alabama	58,598	2,363,939	40.1
48	Mississippi	48,000	1,976,570	41.1
	Total	7,459,607	103,266,024	13.8

Tractor Specifications

Detailed data concerning several hundred farm tractor models of current design are included in a large section devoted to power farming in the 1920 edition of the POWER WAGON REFERENCE BOOK. Supplementing these data are blue-prints showing side elevation and plan views of leading tractors, and an authoritative article on power farming by Professor Earl A. White, treating the design, application and use of farm tractors.

New Zealand Market Expands

Taking 25,000 as the official number of automobiles in use in New Zealand, approximately 8,000 are used for commercial purposes and the other 17,000 for pleasure. Owing to the high prices obtained for its primary products during the war, New Zealand is very prosperous, and at least another 25,000 people have sufficient incomes to purchase and maintain motor cars, and another 10,000 have the necessary means to purchase and maintain motorcycles.

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Air Has Advantage in Tire Tests

Statistics of Goodyear's Akron to Cleveland Motor Truck Service, Showing Comparison in Various Ways Between Air and Solid Tires on Seven Trucks Over Period of One Year

STATISTICS show that pneumatic tires are superior to solids for motor trucks from many angles from which the motor truck owner may make a comparison. It has been shown that the use of pneumatics will allow surplus weight to be cut from the chassis with an almost corresponding increase in payload. Also that greater operating efficiency may be obtained by their use. No less authority than F. A. Seiberling, president of The Goodyear Tire & Rubber Company, has predicted that solid tires may be obsolete within a few years.

Much has been written about the experiments by which these facts were proved, but little has been told about the experiences of the company in the development of pneumatic tires and motor trucks —for hundreds of thousands of dollars are spent yearly by the company in experimental work—to discover the tire needs of motor trucks of various weights and under varying conditions.

Previous to 1917 Goodyear had done much experimenting with 3- and 5-ton motor trucks on pneumatics, but testing had been confined to short hauls. In that year, P. W. Litchfield, factory manager, foresaw that larger sized motor trucks could soon be a factor in long distance transportation if equipped with pneumatic tires in place of solid tires with their limited possibilities. To determine the possibilities of pneumatic tires, he decided to put into operation a motor truck service between Akron and Boston. This was done because loads could be obtained both ways—from the factory to its eastern branches with finished product, and from Goodyear, Connecticut cotton mills with raw material. It also offered varying conditions of road.

ALL attempts in these early days to interest motor truck manufacturers failed, as a maximum speed of 30 miles an hour was desired, but finally from one manufacturer a 5-ton motor truck was obtained. The R. P. M. of the motor was increased to 1,600, which gave a speed of about 27 miles an hour, but this was not accomplished until the usual guarantee had been waived. The object was to test tires at high speed and under continuous running.

It was also necessary to design a type of body that would allow a man to sleep in a fair degree of comfort, as one driver rested while the other drove. This was finally completed.

The first trip was started April 7, 1917, after a discouraging succession of mechanical troubles, necessitating the installation of two new motors enroute, and with some tire trouble, Boston was reached after 18 days. The motor design proved incorrect, but as a result of this trip the manufacturer was able to see these weaknesses and to make a motor that would stand the work. Thus did Goodyear further motor truck development. Now a regular schedule of 5 days for a round trip distance of 1,500 miles is regularly maintained.

Critics of pneumatics in early days declared that the added weight of big pneumatics to support a heavy machine would leave little surplus for the pay load. On the contrary it was found that these tires spared the motor truck many jars and strains, so that it could be made of lighter construction. As the chassis was lightened, the pay load increased.

At first a 5-ton motor truck weighing 15,800 pounds equipped 38 by 7 pneumatic tires on front and 44 by 10 rear, geared 9.33; 3rd 13.85; 2nd 24 to 1; low 42.8, with a motor of 5 inch bore and 5½ inch stroke was used. It carried a pay load of 3,850 pounds, limited of course by the carrying capacity of the tires.

EXPERIMENTS were conducted with 3-ton chassis with 5-ton motor until the final experiment in reducing chassis weight has brought about the use of a motor truck that weighs four tons complete, ready to load. It has a 2-ton chassis, 3-ton motor, and is equipped with 38 by 7 pneumatics on front and 42 by 9 on rear. It is geared high 7¼ to 1; 3rd 10.76; 2nd 18.65; low 33.3 to 1. Bore and stroke are 4½ inches by 5½ inches. The significant feature is that with chassis and body weight of 8,000 pounds the pay load carried is 7,000 pounds.

It has been proved that commercial motor trucks are built unnecessarily heavy for use with pneumatics. Motor trucks that are shod with pneumatics can be made much lighter, will also use less gas, will have smaller repair bills and give better general satisfaction.

A careful computation shows that the 5-ton motor truck of 12,700 pounds chassis weight with pay load of 4,800 pounds had a total mileage of 79,200 in nine months and ran 4.5 miles per gallon of gasolene and 67.7 miles per gallon of oil. The latest motor truck of 8,000 pounds chassis weight with payload of 7,000 pounds, ran 16,430 miles in eight months with a record of 6.8 miles per gallon of gasolene and 178.6 per gallon of oil.

By January, 1919, large pneumatic tire development and motor truck construction had progressed to such a point that it was decided to establish a freight transportation line between Akron and Cleveland to secure cost data, get tire mileage records and general experience with high speed pneumatic tired motor trucks in regular freight service. There was little question that costs would compare favorably with freight or express, on the length of the haul about 40 miles each way.

Beginning the first day of the year, some motor trucks were placed in service with the result that approximately 550,000 pounds of the company's own freight were moved that month, a total hauling of 19,325 ton-miles over an average round trip distance of 79.2 miles. By April 1 six motor trucks were in operation, moving 1,450,704 pounds of freight or a total hauling of 32,483 ton-miles that month. In October, eight motor trucks composed the fleet, with one equipped with solid tires to get comparative costs with pneumatics. This month 2,800,793 pounds of freight were moved or a total hauling of 44,421 ton-miles.

On a basis of 45 cents per 100 pounds outbound tonnage, with a minimum charge of 50 cents for packages under 100 pounds, and 40 cents per hundred-weight inbound tonnage, the summary for six months from April to October showed interesting figures. The average number of motor trucks actively operated was 7.7 per day; fleet mileage 81,706, total ton-mileage 212,283, loading capacity (average) 81 per-centum; operating cost $32,530.33; total operating cost $36,382.64, average cost per mile .39813; average cost per ton mile .15324.

The total pay loads hauled in the same period was 10,490,742 pounds, the total revenue $45,908.14, and the profit $9,525.50. Percentage of gross earnings was 51.9 on investment and 26.2 on operating cost. The six months' average efficiency was 5.93 per gallon of gasolene and 143.3 miles per gallon of oil. Mile and ton-mile costs include all units of expense upon national standard cost system forms.

FIGURES of comparative costs of pneumatics against solids for an operating period of 68 days are illuminating. The pneumatic equipped motor truck shows a total travel of 7,054 miles, 89 round trips, averaging 79.3 miles a trip and hauling 19,188 ton miles with a 77.7 per centum loading capacity. The motor trucks on solids ran 6,548 miles, 83 round trips, averaging 78.5 miles per trip hauling 17,632 ton miles with a 76.9 per centum loading capacity throughout. The total operating cost for the pneumatic equipped motor truck was $2,024.60, against $1,980.13 for the one on solids, but the cost per mile was .2868 against .3024 respectively. On pneumatics the cost per ton-mile was .1055 while on solids it was .1123. In efficiency the pneumatics showed 5.9 miles per gallon of gasolene against 5.1 for solids. Oil consumption on pneumatics was 33.2 per gallon while on solids it was 140.7.

Other facts that will prove illuminating are that the pneumatic tired motor truck required 4.3 hours per round trip or 18.6 miles an hour, while the solid tired equip-

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ment shows 5.6 hours for each round trip or 14.3 miles an hour. The gain in favor of pneumatics is 115.7 hours for the same period with a net value of $86.70.

The net saving effected in favor of pneumatics based on earning or ton-mile cost together with the saving in total hours amounts to $217.18. The pneumatic tired equipment shows a gain over solids by reduction of cost amounting to 10.7 per centum.

2 Tanks Displace 30 Horses

The whippet tank, which roared and banged and clanked its way to victory in the war against Germany, is putting horses and mules out of business in the great pine forests of northern Arizona. One big lumber concern here has just put two tanks to work, having bought them from the war department. Each tank has displaced thirty horses and fourteen men, according to company officials. Using horses, it was impossible for the company to haul during the winter months. The tanks, however, take no account of weather conditions.

Stuart Joins Selden

Announcement is made by H. T. Boulden, vice-president of the Selden Truck Corporation, of Rochester, New York, of the appointment of Chas. E. Stuart as assistant sales manager. Mr. Stuart goes to the Selden organization with years of experience in the motor truck field as salesman, dealer and field sales manager, an experience which qualifies him to handle the work in the Selden organization for which he was selected. Mr. Stuart assumed his new duties on February 1.

Electric Truck Haulage

A very complete and enlightening article on the application, use and economy of electric trucks, written by one of the foremost authorities on the subject, forms part of an extensive section devoted to the electric truck in the 1920 edition of the POWER WAGON REFERENCE BOOK. Complete specifications of electric trucks for outdoor and indoor service are also included, together with blue-prints showing side elevation and plan views of well-known machines.

Motor Trucks Serve Selves by Opening Snow-bound Highways

The accompanying photographs give an excellent idea of the difficult task undertaken by the Fisk Rubber Company in trying to maintain an open highway for road transportation between Chicopee Falls and Worcester. The plough shown in the pictures is a 40 h. p. Knox tractor, and carries its own load of 2½ tons. After each

Tractor plow clearing roads.

of two recent storms this machine was in operation day and night, requiring two shifts of three men each, and it ploughed a 20 foot swath the entire distance between Chicopee Falls and Spencer, a distance of over 40 miles. The most discouraging obstacles, in the way of drifts, were met among the hills surrounding the Brookfields, and frequently the piled-up snow on the sides topped the radiator.

The second storm was accompanied by a thaw, immediately followed by a cold snap which caused the snow to become much like solid ice. The fence-high drifts of the solidly frozen snow presented difficulties which were almost unsurmountable. Sometimes an hour or two would be consumed in making head-on collisions into this hard mass, backing away and ploughing into it again, time after time, cutting only two or three feet at each onset. Through such banks only single-width paths were ploughed, but extra broad turnouts were made on each side of such narrow cuts so that there might be no possible chance of any traffic congestion.

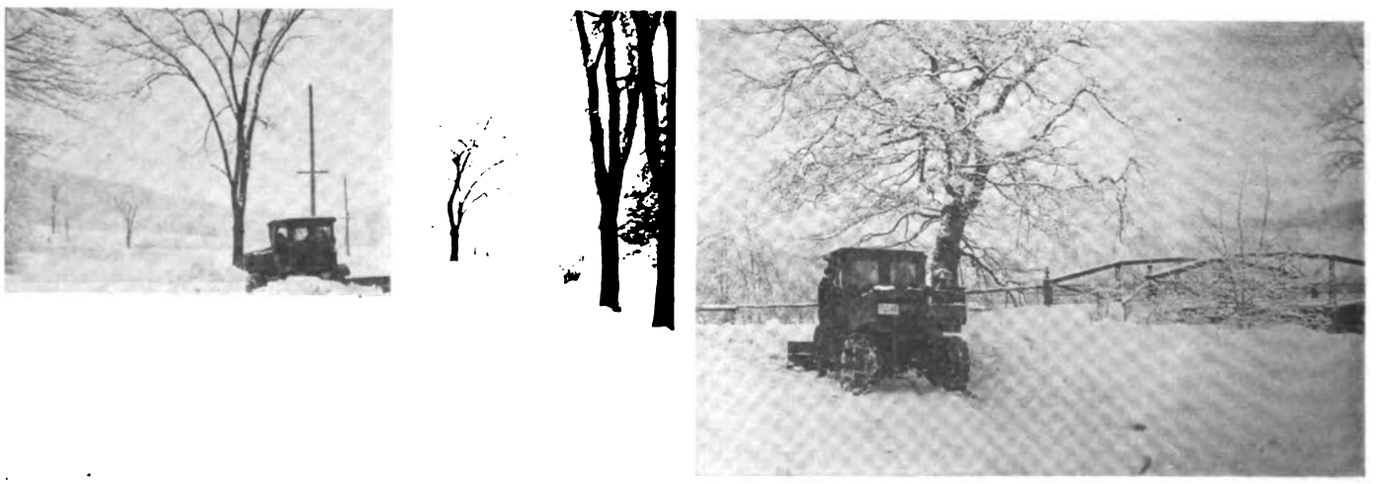
This broad, smooth roadway finished, a good-sized touring car could easily travel from the Worcester City Hall to Court Square, Springfield, in two and a half hours, without a single shifting of gears. This illustrates the great changes which have taken place since industry demanded the year-round use of interurban roads. The New Englander no longer needs to put his car into dead storage at the first signs of snow, but can enjoy its use 12 months in the year—thanks to industrial requirements.

Highway Has New Name

The name of the Burlington Highway has been changed to that of the Mississippi Valley Highway. Cities along the route objected to the distinction given Burlington, a city on the route in Iowa. Action was taken at the annual convention in Jackson, Tennessee. It was also voted to publish a monthly magazine giving views and articles of interest to the route.

Passenger-car Specifications

Complete specifications of 1920 passenger-cars are included for the first time in the new edition of the POWER WAGON REFERENCE BOOK for 1920. These data describe the entire mechanism of each model in a way never before adapted on the same scale. Similar, and even more complete, information is given concerning motor trucks, farm tractors, trailers, and industrial trucks and tractors.



New England roads kept clean by self-serving motor trucks.

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Value of Highway Transport Surveys

By F. VAN Z. LANE

Chief Transportation Engineer, Packard Motor Car Company

TO GIVE a concrete picture of the intrinsic wealth of the world, statisticians sometimes resort to the device of tabulating the debts that are carried by the various nations. The world war, in demonstrating the staggering total of debt which the fighting nations could shoulder and still remain economically sound was a revelation of uncounted resources in world wealth both to the laity and to many business men who had considered themselves well informed.

In the fields of highway transport there has been a colossal number of failures and reports of new transportation companies that have failed are received almost daily. If these debts, the money losses represented by these failures—failures due in a large part to the absence of transport surveys—were the sole reason for the development of such surveys, their value would run into millions.

Insurance against failure is, however, but a small part of the real value of highway transport surveys. Many companies in existence to-day would, if such investigations were generally resorted to, be able to render greater service to the public and make increasing profits for themselves, and these surveys would undoubtedly establish the desirability of highway transportation lines where as yet such lines have not even been thought of.

THE prevalence of failures, paralleling the failures in the automotive industry in its early days, and the number of lines that are operating with a minimum of benefit to themselves and to their public, indicates the most cursory analysis of the territory to be served, or no analysis at all. Many firms are floundering without chart or compass and we should do all in our power to correct the prevalent opinion that all that is necessary is to buy a motor truck of any make you please and any capacity offered, to start it operating over any road available, during any time of the day or week when the driver feels like it, and to charge any price for his service that may come into his head just so long as it is lower than any other price charged for transportation between the points in question.

Just as long as the public has this picture of motor transport lines, just so long will the motor truck incompletely realize its effectiveness. That it can be effective has been proved beyond a doubt. As a mechanical device it has demonstrated its dependability and durability and we have enough experience to know that economically it can perform, and must be made to perform more and more, its function as part of the transportation system of this country.

We are considering the value of highway transport surveys at a time when many business problems of vital importance are pressing for solution. Living costs are high. Labor is scarce. The railroad car shortage is acute and the thousand problems of production are crowding in upon us daily. In all of these problems of our complex business life, there is no factor that affects every phase of economic activity more fundamentally than does transportation. It is, we might say, the very life blood of business and everything that we can do to increase transportation facilities, decrease transportation costs and shorten the time in transit is a vital benefit. Highway transport surveys are, then, not only desirable, but at the present juncture of business conditions, fundamentally necessary.

IF WE are to survey the field in the broadest and most constructive manner, we must do so in conjunction with a survey of other and longer established means of transportation, especially the steam and electric railways. As an aid to these already existing systems, extending their usefulness in many territories, and even replacing them where such practice proves economically desirable, the motor truck has a tremendous field of usefulness. Just where this usefulness begins and ends, how to cover all territories thoroughly and yet avoid duplication of effort can only be ascertained by complete and far-reaching surveys.

Traffic experts of the railroads themselves are giving deep thought to the availability of the motor truck in supplementing their present facilities. The present shortage of both track mileage and of freight cars makes the subject a more pressing one for us who are interested more especially in the automotive branch of transportation.

According to figures from the Interstate Commerce Commission, the total single track mileage of the United States, January 1, 1918, was 253,626 miles and statistics show that the railroad mileage in this country has decreased instead of increased. Last year 689 miles of line were abandoned. This exceeds by three miles the mileage of new lines built during the year. Furthermore, 1919 was the third year in succession in which reports have shown the mileage abandoned to have exceded in the mileage of new lines built. During the three years from 1917 to 1919 inclusive, operation was abandoned on 3,319 miles of line, and in the same period only 2,386 miles in extensions, branches and new lines were completed and placed in service. Thus during this period there has been an actual decrease of 933 miles in the mileage of railroads in the United States. It is interesting to note that this tendency to decrease railroad mileage is shown in all three railroad districts—eastern, southern and western.

These figures are taken from "Railway Age," an authority on steam railroad construction and operation. This authority is also responsible for the statement that the greatest freight car surplus ever recorded on the American railroads occurred in March, 1919, when there were 450,000 cars idle; that to-day there is a shortage of 570,000 cars; that the railroads are, at present, unable to handle all the traffic that is offered to them and that while the present traffic is unusually heavy, further increase can be expected within the next few years. Records of past performances indicate that the future business can not be handled without serious shortages of equipment unless a great many additional cars are acquired.

In addition to this tremendous freight car shortage there is also a great shortage in motive power. It is estimated that nearly 8,000 units of 60,000 pounds average tractive effort should be built during the next three years to take care of the freight traffic alone.

DIRECTOR GENERAL WALKER D. HINES of the American Railroad Administration is quoted in an address before the American Railway Guild on November 18 as saying:

"As well as I can estimate the situation, I believe we are likely to have a large railroad traffic in this country for some time to come. During the war many of the normal demands of the public had to go unsatisfied; there was much building which had to be postponed and many sorts of activities had to remain in abeyance. The opportunity has now come to satisfy those demands, and the building that is beginning to develop and the other activities which are now getting back to a normal basis create a demand for a very large railroad traffic. So I think the railroads must be prepared to handle a large business for a considerable period."

Railway Age is also responsible for the statement that:

"Insufficient terminal facilities constitute a weak link in the American transportation system. Under government control the consolidation of forces and facilities was greatly expanded.

"The outlook for a continuance of unification is not propitious, the concensus of opinion being that it is an excellent idea but impossible of realization following return of roads to private management.

"Solving the problem of inadequate terminal facilities, and of needed coördination of their operation is imperative."

This great shortage of freight cars and motive power and the insufficiency of terminal facilities, in the face of increased traffic, indicates that the motor truck and the highway must be more extensively used than at present if the business of the

[Address delivered before the annual convention, National Highway Traffic Association, Chicago, Thursday, Jan. 29, 1920.—Ed.]

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nation is to be kept moving in the manner that it should. That it shall be kept moving is absolutely necessary to the life of business and its continued growth.

If we compare, for a moment, the total highway mileage in the country with the railway mileage, which is ten to one, and if we also consider the flexibility of the motor truck as against rail operation, and that one method of transport is quite as dependable as the other, we can begin to realize the work that highway transport should be made to do.

In this connection it is also interesting to note that the freight car makes an average of but fifteen miles a day and that the average tons per loaded car is less than 28. From this we can get an even better picture of how the motor truck can greatly assist the railroads in moving the traffic of the country.

I do not believe that the motor truck should compete with the railroads, as a general proposition, but I do believe that they should be operated when it can be shown that it is more economical for such operation to take place. By economic I mean where the motor truck, as compared with the railroad, can cut down the time of delivery, make such delivery more frequently and at less cost.

WHEN we realize the number of absolute business geniuses who have devoted their lives to railroad transportation problems, and then realize the extent to which highway transport can be employed to supplement and extend the usefulness of these same lines, we have a prospect before us broad enough to satisfy the most ambitious and those with the highest ideals.

After the steam railroads, in considering the motor truck as an aid to existing means of transportation, a highway transport survey would concern itself with the relation of highway transport to electric railway service.

The electric railway situation in the cities and suburban and rural districts of this country is in a very chaotic condition. Many lines have been abandoned; others thrown into the hands of receivers, fares raised and service curtailed—all to the great disadvantage of the traveling public. I am quite sure that local surveys would frequently indicate that highway transport in the form of motor 'buses can very greatly relieve this situation.

In a recent issue of the *Electric Railway Journal*, an authority on the electric railway industry, the assistant to the president of the railway company in one of our large cities, in discussing how 'buses are run in that city in connection with the railway, makes the following statement:

"It is believed the motor 'bus is here to stay, that its use is going to increase largely and that the logical people to handle and develop it are those who have been trained and received their experience in street railway operation. It behooves the progressive street railway manager to study the motor 'bus situation and be prepared to meet it and to use it as an auxiliary to his other operations, rather than have to fight it as a competitor."

The 'buses in the city of Newark, New Jersey, a city of 400,000 people, carried 16,000,000 passengers the first half of last year and statistics from several other cities indicate that the 'bus surely is here to stay.

Yet many operations of this kind have been inaugurated and have failed, or are not operating to the best advantage of the general public. The proper kind of survey will, in most instances, save such failures and cause the successful operators to give even better services and be more efficient and point the way to where new operations are desirable and how to successfully inaugurate them.

No general survey of the field of highway transport would be complete that left out of account its use in districts now without rail facilities. Mines, forests and quarries situated in remote sections are generally exploited by big organizations with financial backing sufficient to solve their own transportation problems, and many of them are finding their solution in the use of the motor truck.

In the farming sections, however, where the productive unit is comparatively small, there has not been the same incentive for big business to make a thorough survey of conditions and here there is a tremendous field of opportunity.

The same factors that affect the big manufacturing institutions in the industrial centers—rising costs, labor shortage and lack of adequate transportation facilities—affect equally the producers in the fields. The situation is serious and at any time may become acute. Every help that can be given to the producer of food stuffs adds to the well-being of the nation.

SOME one in authority has said that if the labor situation on the farms is not relieved in some manner that in a short time, for a certain period, some of those in commercial and industrial life, will have to assist the farmer in harvesting his crops if we are to obtain a sufficient amount of farm products. One answer to this, and probably the most logical one, is to so arrange the farmers' transportation that it will be unnecessary for him to take labor from his farm to perform this function, as heretofore, and a proper use of the motor truck and the highway will go a long way toward meeting this problem.

Our present system of food distribution is probably the most expensive the world has ever known. That the motor truck can reduce such costs has been proved absolutely by the government, itself. The savings effected by Assistant Postmaster General Blakeslee in his actual demonstration of highway transport lines from some of the rural districts in Pennsylvania to Philadelphia and Washington are significant, to say the least. On an exhibit recently shown, the Committee on Post Roads and Postal Service, of the House of Representatives, by Mr. Blakeslee of forty-one trips made by the Motor Vehicle Truck Routes, a saving of $6,612 to the consumer was the result. Added to this was the time saved to the farmers who had their produce taken from their gate to the market and who were thus enabled to continue performing actual work on their farms. Just previous to the inauguration of these routes by the Post Office Department, I helped to make a survey of part of this district which indicated the savings later affected. Yet the people there did not realize how materially they could be assisted until this investigation had been made.

Speaking of railroads I am reminded of a story which, no doubt, many of you have heard, of the sturdy freight engine which was pulling a long line of freight cars up the eastern rise of the Great Divide. As it struggled with its burden up the long slope it encouraged itself by repeating—"I think I can, I think I can, I think I can."

As it approached the top it puffed and snorted and caught its breath and gasped once more—"I—Think—I—Can."

Then as it careened merrily down the western slope it chuckled to itself, "I thought I could. I thought I could. I thought I could."

FOR your relief and edification I might say that in following my thought you have already reached the peak and if you can hold out for a few minutes more you will be able to join in chorus with the engine and say, "I thought I could. I thought I could. I thought I could."

We have traveled far in considering transportation surveys in connection with farm and forest, mine and quarry, steam and electric railways, and will close our inquiry by getting right down to cases and see what a survey can do for the individual business.

The hauling and delivery problem of every business should be surveyed in order that the most efficient means of transportation can be used, particularly in reference to the highways. It is astonishing how little most concerns know about the cost of the delivery and hauling end of their business. The concern that usually knows its labor, production, accounting and selling costs, many times has no idea of what its delivery cost is. Yet the delivery and hauling part of the business usually amounts to a great deal. A survey of such a problem will often indicate that it would be more economical to ship or deliver by motor truck than by horse drawn vehicles, railroad freight or express, or by boat or electric railway. In considering a transportation system the nature and character of the business it serves should be considered first.

The proper kind of a survey will bring out all the items entering into the cost which would never be brought out in any other way. For instance, I had occasion the other day to make a survey of the shipping part of a business concerned with the rolling of steel products. This was a large concern with a railroad siding right into its plant. Its products take a very low freight rate and its deliveries are mostly to points located within sixty miles of the plant. Yet, this survey showed that the motor truck could be used to better advantage than the railroad; that

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it could transport material cheaper and exactly as it was wanted.

This survey developed, for example, that the average cost per box used to contain the material was $1.25 and that the average weight of these boxes was 42 pounds, something that the traffic manager of this concern had never considered before in his transport problem. Motor trucks are now being used by this company, thus releasing several freight cars for use where the railroad is the more economical means of transport.

The proper sized motor truck, the most adaptable kind of body, and the use of loading and unloading devices will many times serve to handle the hauling problem more economically and more efficiently.

Such a survey should take us behind the lines, so to speak—back of the loading platform into the shipping room where we could consider such items as boxing, crating, sorting, assembling, routing, internal delivery, etc. It is here that, oftentimes, a study will show how the use of highway transport can cut down the cost of the work leading up to placing the material on the motor truck or on the car.

In making surveys relative to the establishment of highway freight transport lines, the following items should be carefully considered:

All year round road conditions, including bridges.

Rail freight and express rates.

Frequency of existing service.

Time of delivery of existing service.

Amount of, and kind of, freight moving in both directions between the points in question.

Running time possible.

Sentiment of the district under consideration toward existing and proposed service.

Sufficient financial support.

Traffic laws, ordinances and regulations.

Road conditions will determine the kind of equipment that can be operated. The amount and kind of freight will determine the size of the unit, and number necessary, from which can be determined the expense, to which should be added (this is most often omitted) overhead charges, by which I mean the cost of soliciting business, storing and handling of same, superintendents, etc., and which for such lines run very high. The cost of operation will determine the rate. This compared with existing rates and services will determine whether or not business can be secured under such costs. The possibility of promoting return loads should not be forgotten. This, you will note, is quite different from the usual method of arbitrarily determining a rate, which is probably that charged in some other locality and without knowledge of actual conditions.

In a survey of the possibility of establishing intercity motor truck routes out of a certain city recently made, we concluded the lowest capacity motor truck that could be operated, considering the rate that could be obtained, would be a 3-ton size. Yet the operators disregarded our advice and started in with 2-ton machines. If loaded to 80 percentum of their capacity on every trip, in both directions, they couldn't pay—and didn't—the result being the failure of another line and the loss of much confidence.

All this information is very easy to get if gone after in the proper way. Most communities now have commercial organizations which will be glad to assist in the accumulation of such data.

Reliability in such service is absolutely necessary. In the case of highway passenger transport, the number of passengers will determine the seating capacity desired and the frequency of operation, which together with the length of haul will determine operating expenses, and, therefore, the fare that must be charged. Here again reliable service must be inaugurated, as reliability is important in all transport matters.

There is no more important question befor the public today than that of highway transport surveys.

Motor Truck Adopted by Electric Railway

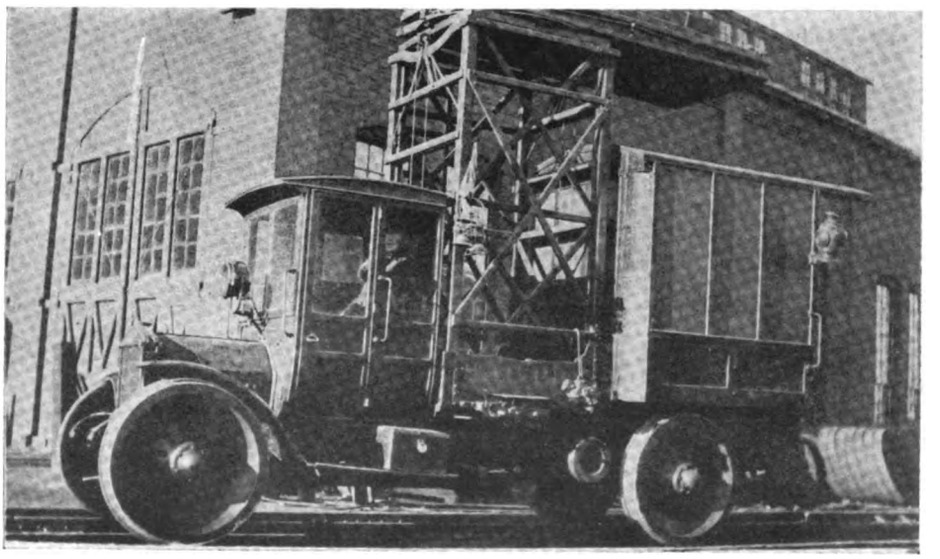
Machine Is Fitted with Tower and Is Used for Repair Work and Other Runs

THE Butte, Anaconda & Pacific Railway Company since 1915 has been operating a 1½-ton Federal motor truck over its rails. This machine is equipped with a Trenton-Cargill tower and is used for repair work, and other runs, on the lines of the company. The experience of the operator with this machine as told by C. H. Spengles will be found in the following account from the chief engineer:

"We have found the machine very satisfactory in every respect for the service for which it was purchased. We make the run from Anaconda to Butte with the morning papers. We make this run, a distance of 26 miles, in 50 minutes making two stops to unload papers. The load on this trip is 2,600 pounds. On its return to Anaconda the motor truck takes out the maintenance crew to repair trolley wires and line. This keeps the car in service from ten to twelve hours each day.

"We have had very little trouble with the car since it was purchased in the Spring of 1915. Some changes have been made and we think they have helped out the car. We put in truss rods on each side frame member. We found that when the line men were stretching trolley the side frame members would sag and bend. The application of the truss rods eliminated this trouble. The wheels that came with the car were of soft cast steel and the flanges wore very rapidly. I had the flanges and part of the threads of the wheels turned off and applied a set of second hand coach tires. These have given good results and we are not having any trouble with flange wear although we are working on curves practically all the time.

"The application of brakes to all four wheels would give better braking power than the present arrangement which is similar to any motor truck. I have figured out an arrangement which I am going to apply but shortage of help has prevented this being done. The change in transmission so that we could get two speeds backing up was not made on account of not being able to get a transmission case in the market to make this change but, I am of the opinion that it would improve the car for this purpose. We have not applied roller bearings because we would have to scrap the wheels we are using at the present time as they have not enough stock in the hubs to allow boring out for the roller bearings. Should we purchase a new car, I would



Truck keeps electric railway going.

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recommend that the roller bearings be applied to the wheels.

"We built a cab on the back part of the car to protect the men and the papers from the weather. On account of the car not having enough speed when backing up we arranged two rails under it fastened to front and back axles with a cross plate at the exact center of load with a ball bearing cap bored to fit a 25-ton Norton jack. We run the car up to any grade crossing that is planked and jack the car up until the flanges clear the rails and turn the car on this arrangement. This eliminates running the car to some point where there is a wye or turntable.

"We have also equipped the cab with a heater which uses heat from the exhaust. It keeps the cab comfortably warm during the winter months. We have applied an apparatus for brushing the snow off the rails in front of the front wheels. This is operated from the cab.

"The car is equipped with a Trenton-Cargill tower which telescopes and can be easily raised or lowered to suit any condition on the trolley line. The top of the tower has a swinging platform so that a man can easily reach four or five feet outside the rails.

The cost of operation and maintenance from January 1 to August 31, 1919, was as follows

Labor	.0342 per mile
Material	.0405 per mile
Lubrication	.0192 per mile
Gasolene	.0575 per mile
Waste and supplies	.0004 per mile
Wages of motorman	.1493 per mile

"This includes a general overhauling of the machine and motor and the building of a larger cab on the back of car which cost $389.42. The original cost of the machine laid down at Anaconda was $3,519.60.

"The car ran 8,702 miles between the dates mentioned. When out with the linemen the motor is running continuously for which no mileage accrues and which uses up both gas and oil."

Vital Trade Statistics

Carefully collected data on the annual production of motor trucks and passenger-cars form a valuable feature of the 1920 edition of the POWER WAGON REFERENCE BOOK, which is now ready for distribution. In the new volume are given also detailed statistics of exports and imports, and the first published record of the number of motor trucks in use by states, supplemented by figures showing the distribution of these machines according to the industries in which they are used.

London Cabbies Strike

All taxicabs were withdrawn from London streets recently as a protest against the increase in the price of gasoline of 16 cents a gallon, making the total 90 cents a gallon. The owners and drivers met to decide whether to strike until the price is reduced or the government authorities a 50 per centum increase in fares.

Report Gradual Decrease in Use of Horses on Farm

ANIMALS ARE LIABILITIES IN UTAH

Horses in this country reached their maximum in 1918 and since then have been gradually decreasing, according to data compiled by the Bureau of Crop Estimates, United States Department of Agriculture. While this statement applies to the United States as a whole, the information secured by the bureau relates primarily to the supply of horses on farms and ranches, the gradual decrease of which is attributed to motor vehicles. That the decline of the horse on farms is not due merely to the use of passenger automobiles is indicated by a survey recently undertaken by approximately 36,000 crop reporters representing the bureau in all sections of the country. They have reported the names of more than 49,000 farmers who use motor trucks on their farms. But the extent to which these motor trucks displace horses is problematical. In many cases the introduction of a motor truck on a farm indicates provision for increased hauling rather than an actual reduction in the number of horses used.

The estimated number of horses on farms and ranches January 1 of this year was 21,109,000, a decrease of 373,000 head, or 1.7 per centum, compared with a year ago. The total value of these animals this year is estimated at $1,992,542,000, as against $2,114,897,000 last year. This means an average value per head for horses of all ages of $94.39, compared with $98.45 a year ago. The average value per head ten years ago was $108.03. From these figures it is not difficult to understand why the horse market is regarded as unsettled and the future equally uncertain. The best demand during the past year has been in the South, while decreases have occurred on the western ranges. During the past two years the increased demand for feed for high-priced meat animals has made it relatively more costly to keep a horse on the farm.

Comments in the reports of field agents to the Bureau of Crop Estimates throw interesting light on the decrease in the number of horses. The agent in South Dakota writes: "With the competition of the gas tractor there has been a diminishing demand for the horses of the class largely grown in this State." The agent in Tennessee states: "The raising of horses and mules has declined to some extent in the past few years. The auto is taking the place of the horse in many instances. With the mule the decline is not so marked, as he is the mainstay of the farm, though a few mules are being replaced by the tractor."

According to the field agent in New Mexico there are no longer any wild horses on the range in his state, and the number of small Mexican cow ponies is rapidly diminishing. The field agent in Utah states that horses are liabilities rather than assets in his section. Speaking of the decrease in certain sections of Washington, the local representative in that state says: "Where a notable reduction has occurred in any county it seems due to replacement of horsepower by motorpower."

While the number and value of horses has declined there has been a slight increase in the number of mules in this country compared with a year ago. Most of these animals are in the Southern States, and the prosperity of that section is reflected in the increased demand and high prices paid for mules. The average value per head is $147.10 (all ages included), compared with $135.83 a year ago and $120.20 ten years ago. The total number of mules on farms and ranches the first of this year was 4,995,000, an increase of 41,000 head, or 0.8 per centum.

Wichita Increases Capital

The capital stock of the Wichita Motors Company has just been increased from $800,000 to $1,800,000. All the new issue has been taken by the stock holders of the company and none of it was offered the public. The Wichita Motors Company was organized in the fall of 1910 with a capital stock of $160,000 half paid in, and the first Wichita motor truck was manufactured and sold in the early spring of 1911. In 1916 the capital was increased to $400,000 and in 1918 was increased to $800,000. The company has never been reorganized and is under the same management today it was when it was first organized.

At first when Wichita motor trucks were offered to the buying public in the Southwest a strong prejudice then existed against buying a "home-made" motor truck. Instead of bewailing this condition, the Wichita Motors Company went after the foreign trade, with the result that to-day Wichita motor trucks are in seventy-five foreign countries. The domestic demand has followed the foreign demand, and the Wichita Motors Company last fall was forced to increase its production materially. The plant built by the Midland Motor Car & Truck Company at Oklahoma City, Oklahoma, was acquired by the Wichita Motors Company, and is now being operated as Plant No. 2. Wichita motor trucks are made in 1-ton, 1½-ton, 2-ton, 2½-ton, 3½-ton and 6-ton standard sizes. The company also makes a specially designed truck for oil field work, where road conditions preclude the use of a standard designed machine, a road builder, and a farm tractor.

Bloomington Joins N. A. D. A.

The Bloomington, Illinois, Automobile and Tractor Association, voted at the last meeting to affiliate with the N. A. D. A. and also entered the lists for the Illinois State Dealers Association convention. Following the organiation of so many new associations of dealers in Illinois, it was decided that the time was ripe to revive the state association, organized ten years ago, but which has been dormant for a number of years. Peoria and Springfield are also competitors for the convention. The time will be late in March or early in April.

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Road Relations to Truck Costs

By ARTHUR H. BLANCHARD

Professor of Highway Engineering and Transport, University of Michigan

HIGHWAYS are merely the means to an end: That end is economic and efficient transportation of passengers and commodities. If this fundamental principle had been the universal basis for the improvement of highways, during the past twenty years, the problem of determining the relation of highways to motor truck operating cost would have been materially simplified. The highway transport engineer or manager can not assume, for every transportation route, that what has been done is what should have been done. In fact, in the case of any one of thousands of proposed routes, he can not assume that the highway is 100 per centum improved even based on the crudest ideas of what constitutes an improved highway. It is well to bear in mind that the construction of highways outside of municipalities is to-day in its infancy. Furthermore, it should be recognized that of the 2,500,000 miles of highways outside of municipalities in the United States, only 12 per centum can be classified as improved and that not over one-fourth of one per centum are suitable to carry intensive motor truck traffic. No thorough consideration appears to have been given to the effect of highways on operating cost by many legislators and commissions when establishing schedules of legal rates for transportation of commodities. For example, the Nebraska uniform rate of one and one-half cents per one hundred pounds per mile recognizes the fact that the roads of Nebraska will not permit a 300-day a year business with 5-ton motor trucks, but entirely fails to recognize the fundamental fact that a 30-mile haul on one route may easily cost twice as much as on another route, particularly as only about two per centum of Nebraska's rural routes are classified as improved.

IT IS evident that a thorough field investigation of every proposed highway transport route should be made and that the results of this survey should be an improved factor in the final decision pertaining to the establishment of a highway transport business. The result of this survey, from the standpoint of highways, may be roughly classified under the following three heads: first, relation of unimproved highways to operating cost; second, relation of proposed new construction and the reconstruction of improved sections to operating cost; and third, relation of sections of improved highways which will not be reconstructed for a period of less than five years to operating cost.

The first class of sections of a proposed route, namely, the unimproved portions of highways, may present conditions of narrow widths of roadways, steep grades, sharp turns or rocky, sandy or clayey surfaces, such that a glance will be sufficient to condemn the route for efficient highway transport. Generally speaking, unimproved highways constitute a positive economic barrier to the development of a highway transportation business. Take, for example, George H. Pride's 1919 average daily cost of $28.56 covering the operation of a 5-ton motor truck for an average of fifty miles per day for 300 days per year. These figures are based on New York City conditions, including the average type of improved highways outside of cities over which his motor trucks operate. Let us diagnose Mr. Pride's cost sheet and determine what would be the effect of substituting a system of poor roads for the system of improved roads in the near vicinity of New York City. It is self-evident that poor roads would materially raise the cost of at least the following items on the cost sheet; tires; oil, grease, etc.; gasolene; depreciation; maintenance, and lost-time period. A combination of a rough roadway on steep grades for a mile section of a 25-mile route might easily double or treble the operating cost if not actually rendering continuous operation of a truck over such a route impracticable.

THE following interesting deduction pertaining to saving in gasolene which will result when the system of five thousand miles of highways in Illinois are improved has been made by A. N. Johnson. He assumes that these highways will develop a traffic of 500 motor vehicles per day for 300 days in the year. He estimates that the saving of gasolene by the above traffic on improved roads as compared with earth roads would be 66,000,000 gallons per year or approximately $15,000,000. The results of tests carried out by the White Company, of Cleveland, with a 2-ton motor truck are of interest as an indication of the saving of gasolene due to operation of motor trucks on some of the types of pavements suitable for trunk highways as compared with operation over earth roads. The investigations showed that on concrete and brick pavements it was practicable to operate a loaded 2-ton motor truck for an average of 11.5 miles on one gallon of gasolene, whereas on the average earth road only 5.8 miles to the gallon were obtainable. In round figures, the conclusion drawn from the test was that it was possible to operate the 2-ton truck on high-class pavements for twice the distance which was practicable on earth roads.

The second classification of highway sections covers those parts of routes which are liable to be constructed or reconstructed within a comparatively short period after the establishment of a transportation business. This phase of highway improvement demands serious consideration as construction and reconstruction generally implies that vehicular traffic will be shunted onto detours, most of which are far from satisfactory, considered from the standpoint of economic highway transport. The growth of motor transport will force highway engineers to give serious attention to providing serviceable roadways for traffic during highway improvement. In some cases roadways are provided alongside the highway under improvement, in others one-half of the highway is improved at a time and in others the traffic uses detours. Highway transportation interests will soon emphatically demand that the same consideration be given to the facilitation of highway transport as is usually provided for railway transport when a railroad line is under reconstruction.

IN connection with the third general class of highway sections of a given route, that is, improved sections which will not be reconstructed in the near future, it is necessary to consider the influence of each fundamental element of a highway upon economic highway transport. The elements which will be considered are drainage, foundations, grades, widths of roadway, shoulders, curves, roadway wearing courses and bridges.

Drainage and Foundations.—American highway literature contains an enormous amount of advice pertaining to drainage and foundations. Although it is generally conceded that the importance of this subject has not been over-emphasized, nevertheless American practice is far from satisfactory. The writer believes that the increasing use of highways by motor transport will cause so many failures of insufficiently drained highways and others which have weak foundations that there will be a general improvement in the near future. As loads are transmitted from the wearing course to the foundations and from there distributed to the subgrade, the bearing power of the soil composing the subgrade is an important factor in the design of the highway. It is well known that the bearing power of soils in many instances is materially increased by efficient drainage. The roadway, therefore, should be so drained that the maximum bearing power of the subgrade is developed. While a poorly drained roadway might support a light rural traffic, it will be rapidly destroyed if subjected to commercial motor transport including, for example, several 5-ton motor trucks.

The greatest improvement noted in American foundation practice is the use of cement-concrete foundations, or stone foundations of equivalent strength, on state trunk highway systems. The concrete foundation, as a structure, should be analyzed from the standpoint of the external forces acting upon it, the

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stresses resulting from such forces and the composition and depth of the concrete foundation to provide for the strains within it. Based on statistics furnished by many motor companies, the maximum concentrated load under one rear wheel may amount to 11,000 pounds. This load, therefore, distributed over the area of contact of the tire may be considered the force for which the foundation should be designed from the standpoint of direct compression. The foundation may likewise be considered as a beam or slab, two or four concentrated loads of the above amount being considered as beam reactions while the upward pressure of the earth against the base of the foundation may be considered as a distributed load. Depending upon the possible position of the loads assumed, the beam or slab may be considered as a continuous structure or one with cantaliver projections. Again, assuming that the subsoil under certain sections of the foundation is not in contact with the base of the foundation, a beam or slab action may take place considering the external force to consist of a single concentrated load of 11,000 pounds and the beam or slab to have both ends fixed or to have one end fixed and one end free. It is self-evident that several assumptions may be made relative to pressure on the subsoil, the conditions of the subsoil beneath the concrete foundation, the distribution of the external forces, and impact forces.

ALTHOUGH data is meager upon which to design concrete foundations, nevertheless it is high time that a concrete foundation should be looked upon as a structure and designed as far as possible according to the methods now used in designing other structures. The design of the foundation is particularly complicated, due to lack of knowledge pertaining to the distribution of the load through the concrete, the pressure on the subgrade supporting the foundation, and the manner in which the concrete foundation acts as a structure. It is apparent, however, that a series of assumptions may be made upon which the design of the concrete foundation may be used, and that the results may be used as a guide to determine the composition and depth of the foundation.

The highway transport engineer or manager can neither assume that drainage systems and foundations have been scientifically designed nor that these important elements of a highway have been constructed in accordance with practice based on service tests. Highway transport literature contains many references to cases where motor trucks have become mired in poorly drained roadways or have broken through wearing courses supported by weak foundations. When the transport survey is made, care should be taken to determine, by inquiries along the route, the ability of the roadway to carry heavy loads during the spring especially. It is well to keep constantly in mind that an ideal roadway surface is not necessarily an indication that the drainage system and foundations are suitable for motor truck traffic. From the foregoing discussion it will be seen that poor drainage and weak foundations on a section of a transportation route may readily wreck a highway transport business or at least require the charging of higher rates to cover increased cost of operation.

Grades.—Only general deductions may be made pertaining to requirements relative to grades for motor transport. Unfortunately little data are at hand covering the relative efficiency of motor truck transportation over various grades on different types of roadway surfaces. Of course, the general deduction may be made that the cost of haulage varies directly with an increase in grade and that the tonnage which can be economically hauled varies inversely with an increase in grade. In all probability the present fundamentals of grade design will not be modified until sufficient data have been accumulated to demonstrate that present practices are uneconomical either from the standpoint of motor transport or the maintenance of the roadway. The cost items relative to tires, grease, oil, gasolene and lost-time period and probable depreciation and maintenance will be increased by material grades on transport routes. General allowance can be made, but close estimates are impracticable unless the transport engineer has had experience with exactly the same conditions which he encounters on a new route.

Widths of Roadway and Shoulders.—Roadways economically designed must provide for carrying the traffic on the paved roadway surface and not rely upon earth shoulders to carry a part of the traffic or serve as turnouts. It has been demonstrated that the latter practice is not economical from the standpoint of the maintenance of the pavement or shoulders nor is it efficient or safe from the standpoint of traffic using the highway. In order that a two-traffic line highway should be satisfactory for all classes of vehicular traffic, it will be necessary to follow English interurban traffic practice which requires that slow-moving, or in this case commercial traffic, shall keep to the side of the roadway. It is, however, obvious that the driver of a heavy motor truck will insist upon allowing a certain amount of leeway between the outside wheels of the motor truck and the edge of the roadway, as many operators have had unfortunate experiences with motor trucks being stalled in soft shoulders or ditched. From observations of commercial traffic made on many highways outside of municipalities, it is the writer's conclusion that it will be necessary to allow at least a foot clearance between the body of the motor truck and the edge of the paved roadway. Furthermore, these observations indicate that motor truck drivers, traveling at speeds from 10 to 15 miles an hour, will endeavor to maintain a clearance of two feet between passing vehicles. A compilation of the maximum width of 8 feet for each of two motor trucks and the clearances suggested indicates that a minimum of 20 feet for two lines of traffic is a conservative recommendation. It should be observed that the county highways of England and the national routes of France have been constructed, for many years, with roadways having widths of not less than 20 feet. If the transportation survey indicates that the amount of traffic will require provision for more than two lines of vehicles, a greater width than 20 feet should be adopted, the additional width depending upon the character of the traffic. It does not require much imagination to reach the conclusion that many interurban highways will be subjected, during the next decade, to traffic which will necessitate roadways sufficiently wide to accommodate at least two lines of motor trucks and two lines of passenger cars.

THE above discussion indicates that highway transport investigators will do well to give careful thought to widths of roadways on a proposed route. On a narrow roadway, say from nine to fourteen feet, there will be, in many cases, continual danger of running on to earth shoulders with resultant serious loss of time if the motor truck should become stuck in soft material. Furthermore, a given width of roadway is able to carry a certain maximum traffic. As this limiting amount of traffic is approached or exceeded, there will be serious loss of time due to congestion of vehicles. The cost item of lost time, therefore, may be materially increased, due to narrow and inadequate roadways existing on a given transport route.

Curves.—Motor vehicle traffic has effected a decided improvement in the design of highway curves, especially in the direction of the easing of sharp curves, provisions for clear sight around curves and the banking of roadways. The importance of these details will be accentuated by the development of motor truck traffic. Many routes have so many sharp turns that this element of highways may effect economic transport through lost time in negotiating such turns, increased wear of tires, and possible depreciation and maintenance due to collisions or other accidents.

Roadway Wearing Courses.—The forces due to motor truck traffic, which should be given consideration in the selection of a roadway wearing course, are the direct load causing compression in the wearing surface, impact forces, and shearing forces of the driving wheels, the amount of which will be a function of the weight of the vehicle and the speed at which it travels. If all of these forces have not been given proper consideration, the wearing course will wear rapidly or will disintegrate. The wearing course is of particular interest to motor truck users because of the variations in resistance to traction on different types of roadway surfaces. Statistics are meager relative to traction, especially as concerns motor trucks. Investigations made to date are merely a drop in the bucket as compared with the amount of research which should be undertaken in order to have available reliable data. At the present time, only the most general conclusions can be drawn as was the case with the tests carried on by the White Company, cited above.

Highway transport interests should give careful consideration to the effect on motor trucks due to travel on different types of roadway wearing courses. The mistake is too often made of considering wearing courses in their ideal state or during the first six months after completion. All

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types wear under traffic and hence the character of the surface of a roadway after two to five years' life is generally more important than its condition upon completion of an improvement. Not only is resistance to traffic increased as the surface becomes worn, but furthermore, the effect on the motor truck through impact forces caused by travel on rigid monolithic pavements will result in a material advance in depreciation and maintenance charges.

Bridges.—A bridge is an integral part of a highway. It is to be regretted that this fact usually has not been recognized by lawmakers. Many highways are built of sufficient strength to carry the motor traffic to which they are subjected while the bridges are so weak that their condition prevents the use of the highway by a part of the motor truck traffic. Many citations may be given of highways which have had to be abandoned as commercial transportation routes due solely to the weak conditions of the bridges. One reason for this conditoin is that many state laws provide for the construction and maintenance of roadways by the state, while the bridges are under the jurisdiction of counties or towns. It is self-evident that bridges of trunk highways connecting municipalities should be designed for loads of not less than 30,000 pounds and it would appear advisable, considering the character of the structure, to follow the practice of the Pennsylvania State Highway Department and design highway bridges for loads of 40,000 pounds. The clear width of the roadway of a bridge should comply with the requirements pertaining to roadway width cited above. In addition, the vertical clearance should be given consideration and in this connection the overall height of 12 feet 2 inches for motor trucks heretofore mentioned should receive attention. This is an important factor, not only in the design of through truss bridges but likewise in providing for clearance underneath railway bridges.

HIGHWAY transport companies should thoroughly investigate permissible loads, clearances, roadway widths of highway bridges or transportation routes. Many instances have come to the attention of the writer where bridge load limits of 2 or 3 tons have occurred on highways whose surfaces are capable of carrying 5-ton motor truck traffic.

English Practice.—A discussion of the relation of highways to operating cost would be incomplete without reference to the large fund of general information which may be found in the motor truck literature of England, where highway transport outside of municipalities has been under development for several decades. The status of motor transport in England in 1909 is aptly described in the following statement by Col. R. E. Crompton, M. Inst. C. E.: "Although our roads came first, and their development occupied the best thoughts of our leading engineers at the time of Telford, when railways were introduced road development took a second place until quite recently, when it was seen that the general introduction of motor vehicles was rapidly bringing back the roads into favor, not only for carrying passengers and distributing materials for short runs, but to act as feeders to the railways, and in many cases to become rivals to the railways themselves for short hauls, or, in fact, in all cases where economies in the terminal charges and in the packing of goods, especially those of a perishable character, can be effected by these goods being loaded at the starting point into a vehicle which carries direct to the consumer without transshipment or intermediate handling. The economical advantages of this last consideration are so great that many business firms have now found that they prefer to deliver direct in their own vehicles goods which they had hitherto sent by their horse-drawn vehicles to the railway stations and which had to be twice transferred, first from their vehicles on to those of the railway, and again from the railway vehicles to the railway vans. A study of the statistics of increase of traffic on roads radiating distances of at least 30 miles from our large business centers has shown us that, as the vehicles and as the roads themselves are improved, this radius of direct haulage is likely to increase, and will probably have a very important effect on the distribution of the population, and must with absolute certainty be reckoned with in considering all questions of construction and upkeep of the roads themselves."

THE foregoing discussion indicates that the probable cost of transport over highways outside of municipalities is not susceptible of an exact mathematical analysis. Although this situation is far from satisfactory, it does not mean that highway transport should not be based on as definite analysis as our present fund of information and experience warrants. The interrelationship between highways and the cost of highway transport is so interwoven and complex that many highway transport managers have literally thrown up their hands and simply taken a chance upon the results to be secured from organizing transportation companies. Based on the meager investigations made to date, taken in combination with the combined experience of English and American highway transport authorities and highway engineers, it is evident that certain general conclusions may be drawn as a result of a careful highway transport survey for any proposed transportation business. A consideration of these deductions will usually warrant the installation of a highway transport business or the positive rejection of the proposition. This is particularly true when it is considered that the installation of highway transport in a given community should not be based on a narrow margin of profit. There are too many uncertain factors, such as competition with other transport companies and common carriers by rail and water, state regulations pertaining to weights, dimensions and speeds of motor trucks, legislation pertaining to licenses, franchises and rates, snow removal practice, and variations in the volume of business, to justify a highway transport engineer or manager figuring profits and losses from a business standpoint in thousands of dollars and the variations in operating cost due to the several highway factors in thousandths of a cent.

Strange Old System That of Doing Work With Horses Back in 1920

In a century or two the people of the civilized world will refer to the curious and primitive custom of having animals to supply power for work in the fields which existed prior to 1920. It will seem a strange old system to them.

The horse was a great friend to man in bridging over the stage between hand work and machine work in the fields. The ox and mule also played an important part. But the use of animals was only a makeshift, viewed in the perspective of centuries.

In the other industries man worked with his hands until a machine was invented. The machine extended the man's arm, so to speak, and made it more powerful and efficient.

The tractor is the logical fruit of man's inventive genius as applied to agriculture. The use of animals was only a temporary and incidental step, in a sense.

The use of the tractor is tremendously significant, not only because it provides a new motive power for farm work, but because it ushers in the era of power farming in general—the use of all kinds of machinery for the various work that is necessary. It stimulates the invention of many machines to relieve the hard manual labor, such as small portable elevators to take the place of grain shovelers, power cream separators and churns, power wood saws, grindstones and similar tools, electric washing machines, electric irons, etc. The coming of the tractor will indirectly bring about a gradual emancipation of the farmer and his wife from the hard work that has caused so many of them to leave the farm. It will take time, but the process of transformation is now at work.

Garford Export to Gotham

President E. A. Williams, Jr., of the Garford Motor Truck Company, Lima, Ohio, announces the removal of the Garford Export Department, April 1, to New York City, where offices have been secured at 41 Park Row. The removal of this department to New York is being made in order to facilitate the transaction of Garford's foreign business which has been enjoying a phenomenal growth since the war. As many Garford motor trucks are shipped from the port of New York in the course of a year, the location of the Garford export department in that city will result in an even closer touch with foreign distributers and enable the company to render more personal service. Earl F. Sayers will continue as director of exports, and will be in active charge at the New York office.

The scarcity of farm labor is a serious problem and for the farmer to overcome the big shortage in help, he must provide himself with the most up-to-the-minute means available to handle his crops. Motor trucks are his salvation.

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Successful Dealers and Their Plants

XXII

HARTNETT-STEWART COMPANY, CHICAGO

AN extremely youthful distributing company, which is building solidly and from the ground up on the well-approved policy that service to the motor truck user is the most important part of the dealer's work, has charge of Atterbury sales in Chicago, the State of Illinois and Northern Indiana; and it has already had ample evidence that this policy is worth following. The company is the Hartnett-Stewart Motor Company, with new and handsome quarters in the Chicago automobile and motor truck district, at 1819-1821 South State Street.

Although the coupany started absolutely from scratch, last June, thus being compelled to form its plans and its organization from the beginning, with nothing to build on but a good motor truck and a good policy, it has got the Atterbury established in Chicago, where, as everybody in the field knows, there is about as keen competition for motor truck business as can be found anywhere in the country. This indicates that the concern "has something," as they say of the athlete who makes good, and the conclusion seems to be abundantly justified.

The officers of the company are John M. Hartnett, president and treasurer; J. Ira Hartnett, vice president, and J. W. Stewart, secretary and manager. President Hartnett is a successful business man, with much financial and selling experience, while Mr. Stewart has had eleven years of contact with the motor truck business, through connection with the Kelly-Springfield, Clydesdale and Acme organizations. The combination of actual motor truck experience with general financial and selling experience is very nearly ideal, and may explain the soundness of the procedure which was adopted by the new company from the first.

Several things show that the company means business in every sense of the word. It has a five-year contract with the Atterbury company and has a lease of a corresponding term on its quarters on State Street; and its faith in sales may be gathered from the fact that its allotment of motor trucks from the Atterbury factory for the current year numbers 200 machines. Judging by the ground-work already laid, however, as well as by the keen appetite for power wagons which is everywhere in evidence, there will be no difficulty in disposing of this allotment, and perhaps more.

"We are selling transportation, not motor trucks," is the way President Hartnett puts the company's selling policy.

That this is more than a snappy phrase, and that it actually means something, is shown by the care with which a prospective buyer's transportation problem is examined before any effort is made to sell him anything. It is a fixed policy with the company to make this examination first and then, with the data developed as a guide, to make its recommendation as to the machine to be purchased, in capacity as well as in number. Sometimes the buyer's own ideas as to what he needs must be rejected, as it is not regarded as good policy in "selling transportation," to permit a customer to purchase a 5-ton machine when a 3-ton model would do just as well.

It is not to be understood, however, that the Hartnett-Stewart people find themselves compelled to turn a buyer away because his requirements differ from what can be supplied; that is, not as long as it is a real motor truck he wants, and not a converted machine. Inasmuch as the Atterbury line includes models of 1½-, 2½-, 3½- and 5-tons' capacity, it can be seen that almost any requirement in power-wagon transportation can be met, from the relatively lightweight vehicle to the sturdy giant which can slip away with ten thousand pounds of dead weight aboard.

THIS preliminary investigation, then, is the first step in the service rendered. Once the purchase is completed, the customer is, as a matter of routine, taken care of in every detail. His chauffeur is carefully taught the niceties of handling the machine; an inspection every thirty days, with a report indicating any points in handling which should be given more careful attention, is strictly required; repair service is provided by a force of mechanics backed by ample machinery and a full stock of parts, and when trouble occurs, at any hour of the day or night, a telephone call will bring a man on the jump.

This sort of service not only keeps customers sold, but results in additional sales. In one instance, an Atterbury buyer in Chicago, having some sort of trouble of a minor nature, was so pleased at getting prompt attention on a night call that he promptly decided to tie up to the Hartnett-Stewart organization, and will replace his fleet throughout with Atterburys. That sort of thing is one reason why service of the right kind pays.

The company's quarters on South State Street are in a building 60 by 120 feet. The front part, 60 by 40, is devoted to the sales room and office—the sales space, by the way, being crowded with husky motor trucks, indicating a pleasing ability to get the goods, even in these days of slow deliveries—and the rear section gives a shop and service department of generous size, 60 by 80 feet. The entire building is well heated by its own steam plant, enabling the maintenance of any temperature desired even in the coldest weather.

The shop and service section is well lighted by a skylight in the high room and

Exterior view of Atterbury Chicago salesrooms.

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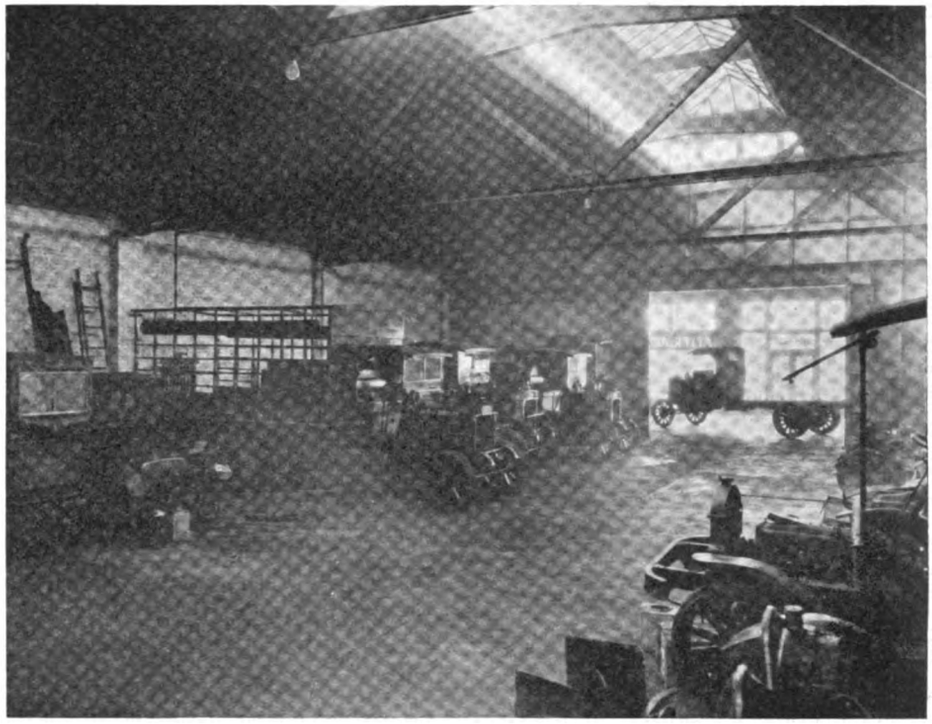
by windows which run nearly the height of the rear wall. Access is had from a paved alley in the rear, which is wide enough to enable a motortruck to turn and thus makes it unnecessary to attempt running machines in and out at the front entrance, a necessity which handicaps a great many dealers, making it difficult to maintain the cleanliness and quiet which are so desirable in the office and sales room.

The shop is in charge of H. A. Hadley, as superintendent of service, and long experience with the Service and Clydesdale companies have qualified him to handle this vital department of the company's work to the best possible advantage. With ample mechanical equipment, a full stock of parts and a determination on the part of the concern to make its service 100 per centum, this department is well cared for.

As stated above, an excellent foundation has been laid in the shape of a sound selling policy, and sales have already demonstrated its success. The Atterbury fleet in Chicago consists of about 35 motor trucks in regular service, including those operated by such concerns as the Edward Lasham Company, the Englander Spring Bed Company, Julius Hamburger for Alfred Decker & Cohn, McKeown Transportation Company, Washington Heights Motor Transfer Company, Aeroplane Express Company, Short-Mynaigh Contracting Company, Peerless Candy Company, S. T. Nickelson and others.

At present the company is developing the Chicago territory by intensive work on the part of its sales force of five men. It will handle the outside territory by the usual plan of selecting dealers in representative towns. Newspaper advertising has been used and will continue to be used as a means of developing business, both in and out of Chicago, the large circulation of the more popular papers making it possible to reach the public by this means without excessive cost.

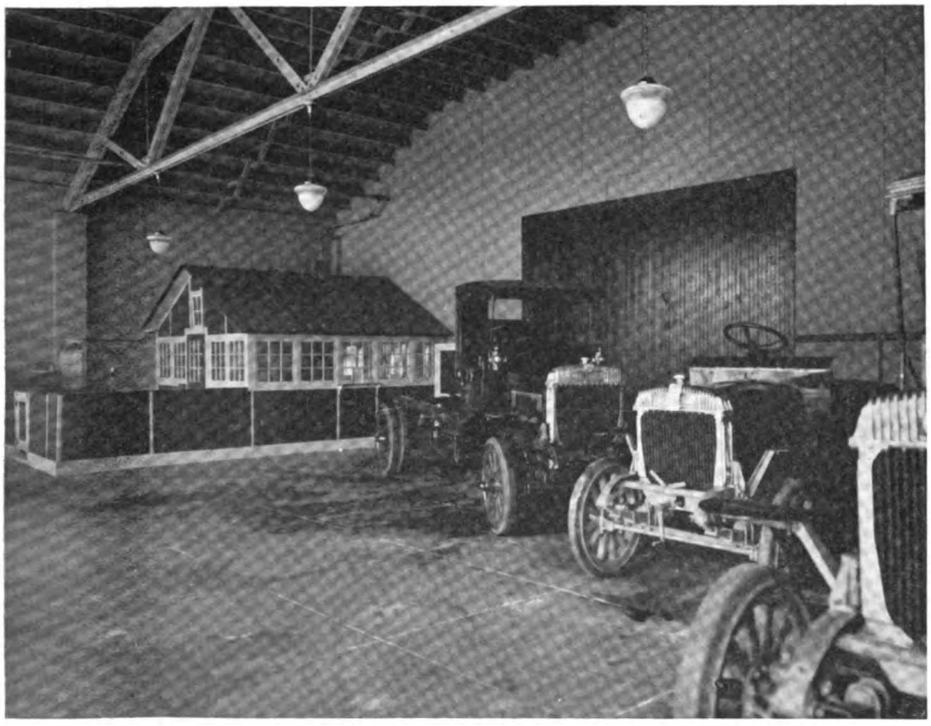


Service room in Hartnett-Stewart Company's plant.

The Atterbury was shown by the company at the recent Chicago motor truck show, in the shape of several finished jobs which had been sold to Chicago concerns, and the display attracted much favorable comment, especially from several officers of the Atterbury company who visited the show, including J. R. Sprakes, general manager, W. A. Clare, sales manager, and Edgar C. Neal, treasurer.

It is worth special notice that bodies for all Atterburys sold by the Hartnett-Stewart company are built in Chicago under the company's direct supervision, enabling customers to have every detail of the bodies to be used precisely as they desire. This has proved very pleasing to buyers, and indicates the considerable advantage of having bodies built on the ground.

With a first-class motor truck and an unsurpassed field for its operations, the company has been wise enough to start from the beginning instead of attempting to do everything at once; and there is every reason to believe, judging by what it has accomplished, that it will be selling Atterbury motor trucks and rendering good service to Atterbury users for some time to come.



Corner of Atterbury's large display rooms.

Ace Wins Against Stacked Deck in Game Played With Old Boreas

No storm in recent years has so greatly impeded traffic of all kinds, to the extent of complete tie up, as has the one which recently swept the entire East. Then as never before many motor trucks especially found their limitations.

Quite remarkable stands out the experience of Ace motor trucks made by the American Motor Truck Company, of Newark, Ohio. The storm caught three Aces, one 1½-ton and two 2½-ton machines, on their way to the New York Motor Truck Show. These motor trucks made their way uninterrupted over the Allegheny Mountains through 3 and 4 feet of snow and ice. Inasmuch as the Ace drivers passed several hundred other motor trucks helplessly stuck in drifts, and as no other machines passed them, they are of the opinion that the Aces were the only power wagons to make their own way through to the show.

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Internal Gear History Told In Eaton Company

Newly Organized Concern Will Double Output in New Factory at Cleveland, Ohio

WHEN the enormous plant of the recently organized Eaton Axle Company, now being erected in Cleveland, is complete it will be among the largest in the world created expressly for the manufacture of motor truck and passenger car axles.

The beginnings of the Eaton Axle Company go back to the days when automobiles were curiosities. In 1892 V. V. Torbensen, now head of the engineering department of the Eaton Axle Company, inventor of the Torbensen axle and founder of the Torbensen Axle Company, had never seen an automobile. Neither had anybody else in America. There were occasional newspaper stories about "horseless carriages" and in France and Germany some famous engineers were working on vehicles propelled by the new creation—the internal combustion engine. In 1892 Torbensen was running a factory in New Jersey for the manufacture of small boats. He had come to America from Denmark as a youth of twenty, some years before to make his way. His father was a country school master in Denmark, poor as a church mouse.

As Torbensen read newspaper feature articles about "horseless carriages" back in the early nineties, he had visions of the "horseless age" they predicted and of what such an age had in store for him.

"I decided to go to Germany and France and study the automobiles that were amazing Europe and the world," said Mr. Torbensen in discussing the growth of the automobile industry the other day. "I sold my business and went. For three years I studied and worked with the engineers of France and Germany and then came back to America. I found a French firm, the De-Deion-Bouton Company, was just beginning the manufacture of autos in New York. I obtained a position with this company as supervising engineer. They made a good car for those days but the axle was not satisfactory. So I began to devote myself to the task of evolving one that would be satisfactory. In 1900 I took out the first patent for the Torbensen axle which was based on the internal gear principle. By this time the automobile had begun to pass from the curiosity stage to the practical stage. There must have been about 20,000 cars in use in America in 1900. I fancied I could do better in the long run if I could develop my axle to better advantage. So I left the De Deion-Bouton Company, now out of existence for many years—and went in business for myself, manufacturing the Torbensen automobile in Newark, New Jersey."

"Most of my cars were sold locally," related Mr. Torbensen, "and the shop that made them looked after repairs, too. This feature gave me excellent opportunity to work out improvements in the axle. And so I stayed in business nine years, until 1910, making axles and automobiles. By 1910 the manufacture of commercial cars had become important, nearly 5,000 having been built in 1909. I had been paying special attention to motor truck axles and had built a number of motor trucks, just to try out my ideas in the axles, and to make them more and more satisfactory. I was satisfied that the Torbensen axle was the logical axle for commercial cars by 1910 and began to look for capital to build axles on a big scale."

It was at this juncture that a mutual friend brought Mr. Torbensen in touch with J. C. Eaton, who at that time was running a cream separator factory in Bloomfield, N. J. Eaton, too, had been a close student of the possibilities of the automobile ever since his graduation from Williams College many years before. He decided to leave the separator business and manufacture axles. The two combined forces and the Torbensen Axle Company was organized and began operations in a small loft in Newark, N. J. By the time the war started in 1914 the motor truck business was growing fast. Approximately 25,000 motor trucks were manufactured in 1914 and the Torbensen Axle Company was taxed to meet the demand for axles. To obtain better manufacturing and distribution conditions and larger capacity, the Torbensen Axle Company was moved to Cleveland in 1915.

The creation of the Eaton Axle Company by the founders of the Torbensen Company follows further inventions by Mr. Torbensen resulting in important improvements of his axle and is in response to the enormous demand for both motor trucks and passenger cars.

"The motor truck business, in its great growth to-day," explained Mr. Eaton, president of the Eaton Axle Company, "corresponds to the amazing growth of the passenger car business ten years ago. It will be years before the automotive industry catches up with the demand for both passenger cars and motor trucks. The nation began 1920 with a greater shortage of cars of all classes than we experienced in 1919. With the probability of a tremendous European demand for American made cars, it will be difficult for American manufacturers of cars and parts to meet the demands."

The Eaton Company, capitalized for approximately $5,000,000, will have its first factory buildings to cost over $1,000,000, completed by May and will be supplying axles for passenger and commercial cars by early summer, Mr. Eaton has announced. By fall the company expects to double its capacity.

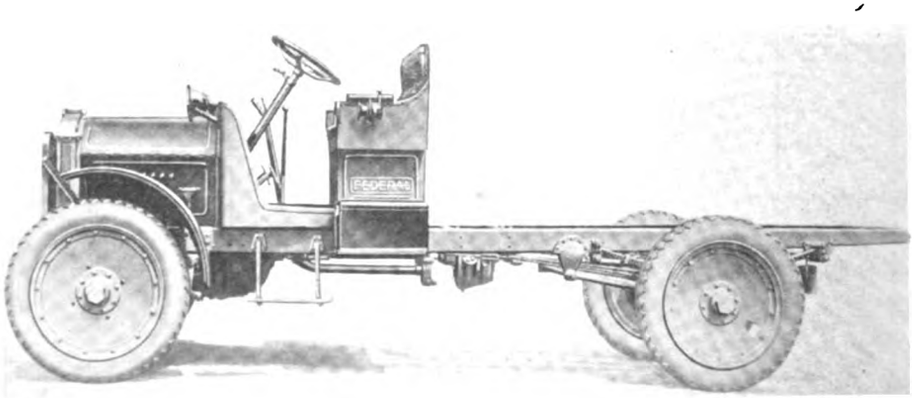
Federal Adds a 1-ton Speed Model To Complete Its Line of Trucks

These are strenuous days in the motor truck manufacturing business; labor conditions in this business, as in others, have been unsettled and costs therein rising; materials have been scarce and prices of same mounting.

But, the demand has been so insistent that Federal found it necessary to speed up in designing and construction of the new Federal 1-ton series.

The 1-ton field is the most overcrowded of any capacity motor truck to-day—overcrowded as to models and as to prices. Too much stress, however, has been placed upon low prices, excessive speed and extremely light weight construction.

The new Federal 1-ton shown for the first time in New York and Chicago National Truck Shows is built strictly in accordance with Federal standards of real hard duty service. The essential features worked out in the new 1-ton machine, therefore, are: A governor control speed of 25 miles per hour; pneumatic cord tires, pressed steel frames, disk steel wheels, heavy support radius rods, electric lighting equipment lamps on swivels which can be



Side view of new Federal 1-ton motor truck.

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turned to point where light is needed most, special hard service battery and generator, thoroughly proved power tire pump, steel seat and dash.

The officials of this company are certain from the demand created before this motor truck was put on the market that it has a place of its own in motor transportation. It has all the sturdy lines of the larger Federal with the additional feature of speed. It is a heavy duty motor truck for light loads, not a cut down passenger designed chassis with heavier members and springs. It is not a makeshift in any sense of the word, but it is backed by a thoughtful and careful design with the main purpose of giving successful and continuous service.

Raise $1,000,000 to Jolly Old Dobbin Into One Last Characteristic Laugh

About fifty enthusiastic horsemen met at the La Salle Hotel, in Chicago recently to organize the Horse Association of America. Someone proposed a plan that someone else didn't like—and the half a hundred divided into two camps, holding separate conventions in the hotel.

Harmony, however, was achieved somewhat and a million dollars was subscribed to bring old Dobbin back to a place of supremacy over the motor vehicles. The theme of the deliberations was that the horse is still a live economic factor; that there are more horses and better horses in America than anywhere else, and that the province of the horse is just as great today as it ever was despite the inroads of the tractor and the motor truck.

Wirth Denham of Wayne, Illinois, was elected president of the association, Wayne Dinsmore secretary, and E. A. Bridge, treasurer.

Pneumatics in England

There are various indications that before long big pneumatic tires may be seen in increasing numbers on business vehicles, especially those for passenger transport, in England. The Dalmler Company has an experimental char-à-banc so fitted, the L. G. O. has been experimenting on the same lines for some time, and, last but not least, a 9-inch Dunlop pneumatic was seen at the Olympia Show on the stand of the Dunlop Rubber Company, Ltd.

Motor Truck Parts

Illustrated descriptions of parts and equipment for motor trucks form a very important part of the Reference Text Section of the 1920 edition of the POWER WAGON REFERENCE BOOK, which is now being distributed by the publishers. Leading examples of parts, such as dead and steering axles, bevel-gear axles, internal-gear axles, worm-gear axles, engines, transmissions, carbureters, magnetos, ball-bearings, roller-bearings, etc., are described and illustrated, and equipment, such as tires, carbureters, magnetos, etc., are treated in a similar way. In the case of stock parts such as axles, transmissions and engines, specifications are also given.

Rough Roads Awaken Uncle Sam to Groans of Traffic

CALCULATES ADAPTING THEM TO TRUCKS

WASHINGTON, D. C., Feb. 24.—That the advent of the motor truck has made necessary a complete revision of the plans of the United States Bureau of Public Roads in encouragement (in coöperation with the several states) of highway improvement has been revealed to congress incident to the provision of funds for carrying forward the road work during the fiscal year 1921. Thomas H. MacDonald, Chief of the United States Bureau of Public Roads and other leading officials, have recently had confidential conference with the congressional committees that hold Uncle Sam's purse strings and the burden of their opinion has been to the effect that all programs for highway improvement and maintenance must be revised and rearranged in terms of motor truck traffic.

Talking to a group of congressmen the other day, Chief MacDonald said: "We must now revise many of the standards which we had set up prior to the war. In a way, the war ended one period of our road history and inaugurated another—the era of the motor truck. Prior to 1915 the production of motor trucks was very limited. The whole production up to that year from the time the first machines were manufactured in 1900 was little more than one-half as great as the production during the year 1918 alone, when 250,000 were manufactured. Many of the motor trucks which now use the highways are far heavier than any which the roads had been called upon to carry before the war. Consequently, we are now facing the necessity of practically reconstructing our whole road system to carry this heavy traffic. To do this will call for the expenditure of vast sums of money, including, undoubtedly, much of the money appropriated by congress for federal aid. But before we enter upon so vast a program I feel that it is vitally important that we study the existing situation very carefully to the end that whatever standards we set up to replace the outgrown standards of the pre-war period may be scientifically designed to meet the requirements of the new situation."

To grapple with highway problems as modernized by the influence of the motor truck there has been a grand shake-up at the federal public roads institution and all branches of the establishment—that is, respectively, the testing, research and highway economics divisions have entered upon a survey of motor truck traffic. The purpose is to find out how much traffic there is on the roads, the types of vehicles which compose the traffic, the weights which now or in the future must be carried, the aggregate quantities of products moved, the average distances loads are to be hauled and the maximum size of individual loads. From this data there will be deduced just what service the roads of to-morrow will have to give and what types of road construction will have to be resorted to in order to give that service.

Recent Blizzard in New York Fails to Halt Big Pierce-Arrow Fleets

Blizzard conditions that paralyzed virtually all traffic in New York City during the big storm recently failed to halt Pierce-Arrow motor trucks.

These machines, in fact, played a prominent part in battering open the snow-bound thoroughfares. One group of 5-tonners, equipped with 12-foot snow plows, worked night and day for the greater part of a week clearing the streets. Operating the entire 24 hours, the only time the motors in these motor trucks were stopped was during brief periods necessary to replenish motor oil.

Another example of motor truck stamina is found in the experience of the grocery firm of James Butler, Inc., which kept 85 per centum of its fleet of 65 Pierce-Arrows in operation. The service performed is inestimable, for several hundred branch grocery stores in New York and in Long Island, Brooklyn, Jersey and other neighboring towns were kept stocked with food to avert all possibilities of a shortage. The remaining 15 per centum of the fleet was left in the garage owing to a shortage of drivers.

"We made deliveries during the worst part of the storm to distant points without mechanical trouble and without delay," says D. J. O'Neil, transportation superintendent of the firm.

The Motor Haulage Company, Inc., had similar experience with its motor trucks. Their entire fleet of 51 trucks was in constant operation throughout the storm period operating daily to Elizabeth, Paterson, Morristown and Newark, New Jersey, and Stamford, Connecticut, and Hempstead, Long Island.

Dunn Engineering Company Is Made Chicago Distributer for Rainier

Paul N. Lineberger, sales manager and vice president of The Rainier Motor Corporation, of New York City, attended the Chicago Automobile Show and says that the enthusiasm of the farmers and business men of the Middle West is contagious and mighty gratifying. The Rainier people have remained out of the Chicago territory for the past several years, seeking the right man to handle their motor trucks. Mr. Lineberger succeeded, while in Chicago, in securing the coöperation of the Dunn Engineering Company, who has a large and successful service station, and this company is now devoting its energies to boosting the Rainier. Robert A. Dunn, its founder, issues a house organ called "Dunn's Service Review," in which he extols the Rainier and the service to his patrons he can give. Mr. Lineberger expresses himself as immensely pleased at this connection, which gives the Rainier a leading place among the distributers of automobiles and motor trucks in Chicago.

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Model U, 2-Ton Diamond T Makes Honk in Parade of New Machines

A 4-speed transmission, a special "Dri-gas" intake manifold and vacuum feed system for the fuel designed to obtain best results from present low grade gasolene, forced lubrication for all spring shackles and bearing carriers for the propellor shafts are among the features of the just announced Model U 2-ton motor truck brought out by the Diamond T Motor Car Company. Like the other Diamond T motor trucks, the new vehicle is worm-driven.

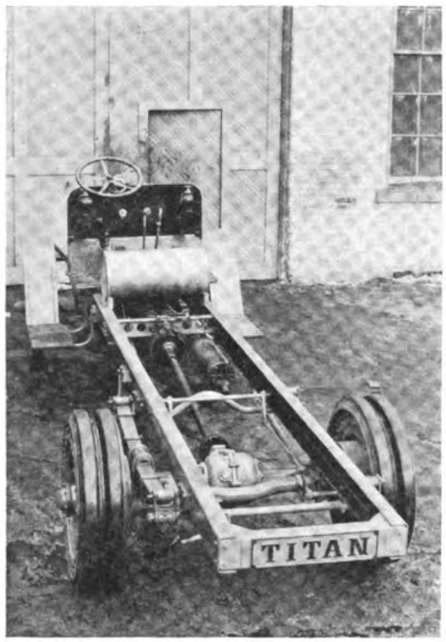
The four speeds give unusual low reduction in the transmission; fourth speed, 1 to 1; third speed, 1.60 to 1; second speed, 2.69 to 1; first speed, 4.75 to 1; reverse, 5.95 to 1.

A vacuum system has displaced the gravity feed for the fuel supply. The special "Dri-gas" manifold, the combustion chambers and intake passages have been designed to obtain the best possible efficiency and economy from the low grades of gasolene now on the market. The Stromberg carbureter is used and there is a dash adjustment to facilitate starting. Ignition is furnished by a Bosch high-tension D U-4 magneto. The unit power plant is a block casting of four cylinders, 4-inch bore and 5¼-inch stroke with an S. A. E. rating of 25.6 horsepower and a maximum of 43 horsepower at 1800 revolutions a minute. All the valves are on one side and have removable heads. Three point suspension with a patent-applied-for ball and socket joint as the rear motor support, is used for the engine.

The Alemite process of forced lubrication for all the spring shackles enables the lubricant to be quickly and surely injected into the lubricating cups by the use of a special device that does away with haphazard lubrication at these points. Oilless bushings—bronze impregnated with graphite—are used as bearing surfaces for brake cross shafts, starting crankshaft and foot pedals.

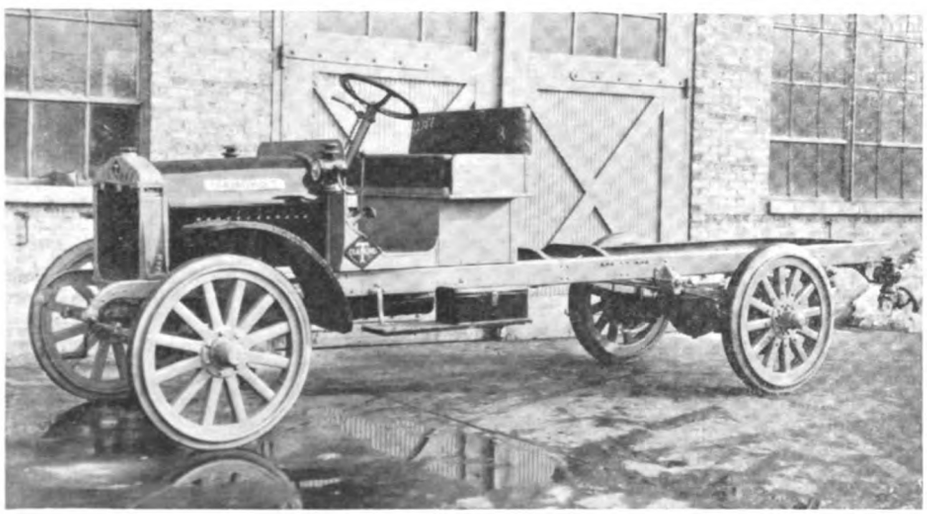
A long whipping propeller shaft is eliminated by using a special Diamond T bearing carrier. Double universal joints are used between the transmission and rear axle, with slip joint to allow for spring action. Between the clutch and bearing carrier universal joints of the Thermoid-Hardy type are used, connected by heat-treated propeller shaft welded to the joints by a patented process. The rear propeller shaft, between bearing carrier and rear axle, is equipped with the standard all-metal Spicer universal joints.

Like all other Diamond T motor trucks, perfected Hotchkiss drive is used and radius rods are eliminated. The semi-elliptic springs are made of chrome-vanadium steel and each leaf is tested separately. The front spring has nine leaves, 2¼ inches wide and 40 inches long. The rear spring has twelve leaves, 2½ inches wide and 53 inches long.



New Titan 2½-ton chassis.

The machine weighs 4,800 pounds. The tires are sold, 36x4 front and 36x7 rear. The fuel tank, with a capacity of eighteen gallons, is located under the seat. The equipment includes a Klaxon warning signal, a special governor built into the motor, hubodometer, front fenders of extra heavy steel, oil side and tail lights, complete set of tools, tool box and seat.



New Diamond T, Model U, 2 tons.

Titan Rounds Out Line With a New Model of 2½-tons' Capacity

The design of the new 2½-ton Titan follows closely the construction of the 3½-ton and 5 and 6-ton Titans with the exception of one or two changes.

The engine used is a Buda, 4-cylinder, "HTU" model, 4½-inch bore and 5½-inch stroke. The crankcase is made of gray cast iron and divided horizontally into halves, the upper half containing the complete crankshaft bearings and the lower half serving only as an oil pan. The connecting rods and pistons can be removed without taking the motor out of the frame or disturbing any other parts. A three-point suspension is used, the rear supporting arms being cast integral with the upper half of the crank-case for support on the frame, and the forward end of the engine being supported at the crank center by suitable trunnion bracket. Pistons are cast iron and provided with special recesses and drilled with relief holes to prevent the motor from smoking. Oil is fed to all bearings by full force pressure feed through drilled crank-shaft. Oil is pumped from the oil reservoir by a gear-pump, through piping to main bearings, then through passages through the crank-shaft to connecting rod bearings. The pistons and cylinders are lubricated by oil thrown from the lower ends of the connecting rods. The oil capacity of the reservoir is 12 quarts. The engine is cooled by water circulated by centrifugal pump through motor and zig-zag tube radiator, cushioned by spring mounting on the frame.

Stromberg carbureter with hot air stove is used. Ignition is from Eiseman high tension magneto fitted with impulse starter. The clutch is a Borg and Beck, 12-inch diameter, dry-disk type, enclosed in housing, in unit with motor.

Transmission is a Cotta, with gears constantly in mesh, transmission in unit with motor. Transmission has four speeds forward and one reverse. Rear axle is a Clark internal-gear, with a solid nickel steel forging as the carrying axle, fitted with heavy duty Bower bearings. The service brake is of the internal expanding type, located in rear wheels, and the 9-inch diameter emergency brake is mounted on the propellor shaft, amidships. Standard tire equipment consists of 34 x 4 solids in front and 36 x 4 dual solids in rear. When desired, truck can be fitted with 36 x 6-inch pneumatic tires in front and 42 x 9-inch pneumatics in the rear at an additional cost. Cushion wheel equipment can also be furnished. Springs are of the semi-elliptic type, fronts 2½ inches wide by 46 inches long, rear 3 inches wide by 54 inches long. Spring bolts are fitted with genuine bronze bushings. Frame is of special alloy, pressed steel channel section, heat treated, 6 inches high, ¼ inch stock and 3-inch flanges. Standard wheelbase is 156 inches. Driver's cab, complete with cushions and curtains, glass windshield, Willard 6-volt lighting battery, electric spotlight, oil side and tail lamps, hubodemeter, jack, tool kit and explosion whistle, are all standard equipment. The price of the chassis in gray priming coat is $3,400, f. o. b. Milwaukee, Wisconsin.

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Owners Launch Nation-wide Drive

New National Organization with Headquarters in Indianapolis Under Supervision of Tom Snyder Starts Compaign for Broadening Influence

INDIANAPOLIS has been chosen as headquarters for the Motor Truck Owners of North America, an organization growing out of the recent shows at Chicago and New York. Tom Snyder, who has been identified with various phases of motor truck work in Indiana for a good many years and who is generally credited with playing a leading part in the various progressive steps taken, has been appointed executive secretary of the new organization.

As a matter of fact, the Motor Truck Owners of North America is not yet all its name implies. Indications are, however, that the various organizations already in existence in the country will be welded into one national association, with sufficient power to secure proper national legislation to replace the hash made of motor truck statutes by the various states working independently.

Mr. Snyder is now on a trip in the East, visiting Pittsburgh, New York, Philadelphia and other centers where motor truck owners already have combined for protection. The real birth of the Motor Truck Owners' Association took place at Philadelphia on February 26, when a meeting was held at which delegates from many organizations were present.

Mr. Snyder has done most of his work in behalf of the motor truck as secretary of the Indiana Transfer and Warehousemen's Association. So strong has this organization of motor truck operators become that a jollification meeting was held at the Chamber of Commerce in Indianapolis on February 16, at which business was strictly taboo. The association has been up to its neck in business for so long that it was considered fitting that it hold at least one session where worry was banished.

THE meeting and banquet also was in celebration of the association's success in fighting the Dean motor truck law, placing state taxes on power wagons on a sliding scale and forcing city operators to pay exorbitant taxes for the upkeep of the state roads. The association caused the arrest of William S. Frye, head of the transfer company of that name, and he was called into the city court, where Judge Walter Pritchard held that the Dean law was unconstitutional, because the title does not express the substance of the act, because it is discriminatory on account of double taxation, and because trailers are taxed without being defined.

The victory amounts to little in itself, since the state will appeal as a matter of course. The decision, however, is taken as an indication of what will follow when the case reaches the State Supreme Court in the near future.

One fight is hardly disposed of in motor truck circles of the Hoosier capital before another is begun. The Indiana Transfer and Warehousemen's Association, backed by motor truck dealers of the state, has now opened fire on the traction freight houses, responsible, it is alleged, for the traffic congestion in the wholesale district. The association made a survey of the situation and reached the conclusion that the bad location of the freight houses was causing Indianapolis motor truck operators and owners something like $200,000 a year in detours and lost time.

The hope is that the traction company will be forced to move its freight houses from the present site. Another meeting is scheduled for May 1, at which the traction officials are expected to make known some definite decision.

This is only one phase of the activity of the Indiana capital. Not long ago, it turned its guns on railways entering the city and finally secured a general plan of raising the railroad tracks, so that motor trucks going through the heart of the city might not be halted by switching and other operations. The work of raising the tracks is about completed and there is a clear north and south track through Indianapolis.

ABOUT a year ago, the city passed an ordinance fixing motor truck licenses at $11 and $21, the smaller fee being for 1-ton vehicles, the larger for all others. The Transfer Association believes in proper taxation, but it was obvious that it was not equitable to force an operator of a 2-ton machine to pay the same license as the man who runs a 5-ton vehicle. Hence a fight over the city tax law, which was finally declared unconstitutional and repealed in favor of one providing a tax of $4 per ton.

These are some of the things accomplished by concerted action in Indianapolis and which, Mr. Snyder believes, can be done anywhere, if the thing is gone at in a systematic way. Enough business houses operate motor trucks to be interested in any sort of a campaign to improve conditions and to be willing to contribute. Mr. Snyder hopes as secretary of the national organization to be able to do on a bigger scale the things that have been accomplished in Indianapolis. The chief aim, of course, is a trans-continental system of trucking, which will be possible only when the roads are adequate for the purpose.

This plan is not so visionary as some may think and its consummation not so distant, Mr. Snyder believes. Only recently a motor truck came into Indianapolis from Grand Rapids, Michigan, with a shipment and Mr. Snyder, through his Return Loads Bureau, sent the operator back with another load. There is hardly a day that he does not arrange for shipments by motor truck to Chicago, Cincinnati, Cleveland and Louisville from Indianapolis.

The Motor Truck Owners of North America, as soon as it is welded into a real national organization, will begin the work of developing the motor truck into an instrument for the shipment of goods from New York to San Francisco and from Chicago to New Orleans. Indianapolis will be the laboratory for these experiments.

New York Electrical Exhibition To Feature Industrial Trucks

With practically all the space on the main floor spoken for and reservations being made on the second and third floors, the New York Electrical Exposition promises to be more interesting this year than ever before. The Exposition will be held at the Grand Central Palace and George F. Parker, the general manager, has just announced the dates—October 6 to 16.

Electric industrial trucks such as are used not only in factories but also at virtually all the important freight stations, will be shown in operation.

A space 70 by 170 feet on the third floor has been set aside for the demonstration of these industrial trucks. Several floor obstructions will occupy this space, affording an excellent opportunity for demonstrating the ease of handling and the flexibility of the little freight carriers. Almost as great an advantage as its carrying capacity is the ease with which these trucks can negotiate crowded passageways and sharp turns.

Tractor Fumes Kill Cattle

Owners of dairy stock should be cautioned by dealers in tractors to avoid operating their machine inside of a barn. John Kadlac, a farmer, of near Algonquin, Illinois, operated his tractor in the cow-barn, utilizing it to furnish power for sawing wood. Due to the fact that the day was cold, the barn was tightly closed. The fumes of the gasoline proved deadly for eighteen head of cattle, while a number of others could only be revived after hard work by a veterinarian.

Truck Chassis Design

Engineers, body builders and draftsmen will find much valuable information in the 1920 edition of the POWER WAGON REFERENCE BOOK, which has just issued from the press. Chassis lay-out practice is clearly disclosed by more than 100 blueprint reproductions of motor trucks, trailers, and tractors, while the details of general design are given in the very complete tabulated specifications. Lists of makers of complete vehicles, parts and equipment are also included, as well as descriptions, illustrations and specifications of stock parts and equipment.

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Boston 1920 Motor Truck Show Promises Record

EXHIBITS TO BE HOUSED SEPARATELY

Boston has its greatest passenger car, motor truck and accessory show, March 13-20, in the making. Two of the largest exhibition buildings in the city will be used to house the display and these are not large enough to accommodate all that want to show their line. Mechanics Building and the Irvington Street Armory, less than three minutes walk from the former structure, will be the homes of the show.

Ninety passenger car and 64 motor truck exhibits will be shown along with 235 accessory displays. The show will be chock full of new things, particularly in the motor truck department. More than half of the floor space in both buildings is given over to motor trucks.

Boston motor truck dealers have never favored a separate show. In past years when the power wagon show followed the passenger car show, the attendance was small and the interest could not be aroused. The salesman seems to be infected with the selling virus with the hall crowded and in the past two years the motor truck salesman has done a tremendous business at the Boston show.

This year all of the commercial motor vehicle displays in Mechanics Building will be in the basement. The motor trucks will occupy most of the space in the Irvington Street Armory but there will be enough passenger cars and accessories to keep the crowd flowing into this exhibit. A number of new cars that have never before been shown here will be "housed" in the armory and this will have a tendency to keep the attendance to the armory show big.

The list of motor trucks that will be shown in Boston's dual show are:

Acme
Acason
All-American
Atlas
Autocar
Bethlehem
Capitol
Brockway
Briscoe
Chevrolet
Clydesdale
Commerce
C-T Electric
Cunningham Hearses
Day-Elder
Denby
Dodge
Duplex
Federal
Garford
GMC
Huffman
Indiana
International
Jackson Four Wheel Drive
Jumbo
Kelly-Springfield
Kissel
Maccar
Mack
Maxwell
Master
Nash
Netco
Northway
Oldsmobile
Oneida
Packard
Paige-Detroit
Phenix
Pierce Arrow
Reo
Republic
Riker
Rauch-Lang Electric
Reynolds
Sandow
Sanford
Selden
Service
Sterling
Stewart
Traffic
Traylor
Triangle
United States
Vim
Walter
Ward Electric
Walker Electric
Walker-Johnson
White
Winther
Wilson

TRACTORS.

Fordson
Cletrac
Beeman
Utilitor

G M C Is Making Rapid Progress in Big Plant at Janesville, Wisconsin

General interest is being shown in the progress being made at the Samson Tractor Company's plant at Janesville, Wisconsin, a General Motors division. Samson Model "M," shown in the accompanying photograph is the 2-plow tractor, price $650 f. o. b. Janesville. Model "D" or the "Iron Horse" is $450 f. o. b. Janesville. This job handles a single bottom plow and will straddle two rows of corn—do the light belt work, handles all the present horse-drawn equipment the farmer may have.

For the Samson ¾-ton motor truck, the chassis price is $550 f. o. b. Janesville. This is a motor truck with especial farm equipment, equipped with rims and cleats enabling the farmer to use this machine over freshly-plowed fields, soft ground, etc. Another feature is the even distribution of the load—no overhang. The motor is placed well forward making necessary room for the load between the front and rear wheels. In addition to the models above referred to there will be in production shortly a 1¼-ton motor truck with the same features as the ¾-ton. Chassis price $950 f. o. b. Janesville.

Trailer Fast Coming Into Its Own in Texas Oil and Lumber Fields

Big business is rapidly adopting trailer hauling. The great oil companies in the producing fields of Texas are using large numbers of 2-wheeled pole trailers for hauling casing to their wells. Large distributing businesses such as wholesale grocers and the great metropolitan milk companies are standardizing their hauling with short wheel base motor trucks and semi-trailers. Some of the large industrial plants which have widely separated departments inside the same factory yard are using Trailmobiles for hauling from one department to another.

In the lumber business, both in hauling from the woods to the mill and from the lumber yard to the building job, the number of Trailmobiles in use constantly increases. This was one of the first fields to take up the trailer hauling principle and it promises to be the first that is completely equipped with trailers.

As is usual in such cases the progress of the trailer hauling principle is fastest where the operators know most about their costs. There is a large saving in first cost and a saving of nearly half the operating expense as compared to a motor vehicle of similar capacity with Trailmobiles of all types. Where a considerable number of units are operated these economies amount to an imposing total at the end of the year.

Truck Specifications

More than two hundred facts of general and special interest concerning each of hundreds of American- and Canadian-made motor trucks are given in an extensive section devoted to engineering and selling data in the 1920 edition of the POWER WAGON REFERENCE BOOK. The machines described are arranged for convenience according to their carrying capacities, so that vehicles of like load-rating can be readily compared. By a simple system of cross-reference the reader is led from frequently sought information to that required only in answer to unusual questions.

Motor Truck Cuts Cost of Granite Quarry Hauling

MACHINE ELIMINATES EIGHT HORSES

In the granite quarrying district of Milford, New Hampshire, motor trucks have until recently been considered impossible of economical operation in the actual taking out of granite. It has remained for James Courage, in charge of the quarries of the Smalley Souhegan Granite Company, to dissipate this fallacy and to demonstrate, through the operation of a 5-ton motor truck, greater efficiency in quarry operation.

The Smalley Souhegan Company produces granite slabs for monuments, curbing, etc. Paving stone is a by-product. Quarries are operated about six miles out of Milford. Granite slabs are secured in the conventional manner, hoisted to the sides of the quarry for cutting, whence the finished work, and resultant by-product, are hauled to the railroad, two miles away, for shipping.

Eight horses were owned by the company, and usually as many more were used on a contract basis. Of late years it has been increasingly hard to secure extra horses in spring and fall, when farm work reduced the available supply. In spite of this difficulty the utility of motor trucks was questioned, in view of the road conditions at the time of year when greatest demands were made on the delivery system.

Mr. Courage carefully investigated the problem from all angles, then bought a White 5-ton motor truck. The machine went into service last March, and has proved a most profitble investment. It has already resulted in the complete elimination of horse hauling, and substantial operating economies.

Teams were able to haul 24 feet of stone and make three trips daily to the siding. The motor truck handles 40 feet of stone (about 5 tons) at a load. Because of the slow delivery when horses were used, it was necessary to haul stone and pile it at the siding when cars were not in place for loading. This necessitated a double handling of the stone at the point of shipping—a wasteful proceeding. The motor truck works rapidly, loads a car with a single handling and in a manner much more satisfactory to the railroad. The machine has also solved a labor problem. Owing to the distance from Milford to the quarry men were hard to get. Now, Mr. Courage calls for his men each morning, and transports them to the quarry. Result, he gets the pick of Milford's expert workmen. In dull seasons general hauling is done, and the motor truck proves invaluable in long distance deliveries. It has frequently been called upon for trips to neighboring cities within a 100-mile radius, and has been giving excellent service. At present, Mr. Courage says, the motor truck's capacity exceeds the output of the quarry, but he fully expects that the increased facilities for prompt delivery which it affords will result in a large increase in the quarry's business. Evidences of such increase are already noticeable.

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Postal Department Cuts Costs

Saves Hundreds of Dollars per Motor Truck Load on Produce Delivered to Consumers from Rural Districts

"BOOST Your Route!" "Help Your Community!" "Help Yourself!" "Stop the Truck!" These are the slogans used by Fourth Assistant Postmaster General James I. Blakeslee to interest the farmers of Pennsylvania, Maryland, Utah and Virginia in the Postoffice Rural Post Service. It has taken hold instantly. The speedy Commerce motor trucks used in this service are handling packages to capacity on their 160-mile routes.

War truck chassis with khaki colored bodies are doing the work, handled by drivers who enjoy the work and enter into the spirit of it with a smile—it is pleasant work. It is not as boresome as plodding back of a horse who made short, slow runs, but meeting the farmers and their families and driving over the highways at the wheel of a big, powerful, speedy motor truck, as comfortable as a passenger car because of the big pneumatic cord tire equipment, is enjoyment.

These war machines now in the postal service were manufactured by The Commerce Motor Car Company, of Detroit, for the War Department to haul machine guns and their crews, and their performance and dependability at Chateau Thierry, in the Argonne and other fierce encounters is known to every veteran who took part in these battles.

Numbers of these Commerce chassis never left the country. They are now being turned over to the Postal Department. In some instances, notably at Washington, Baltimore, Atlanta, Detroit, Milwaukee, Toledo, Minneapolis, St. Paul, Cleveland, Nashville, Pittsburgh, St. Louis, Los Angeles, San Francisco, Oakland, Berkeley, Jersey City, Augusta, Des Moines, Kansas City, Racine, Grand Rapids, Kalamazoo, Evansville, Indianapolis, East St. Louis, Quincy, Springfield, (Ill.), Cincinnati, Youngstown, Dayton, Akron, Portsmouth, Warren and Zanesville, they are being used in the collection service. That is, they are used to collect mail from street boxes and hauling it between the postoffice and transportation depots.

Postal truck making first school delivery in U. S.

Another lot went to the rural parcel post division of the postal service—out to serve the country districts, to bring the country nearer the city and the routes have been a success. Loads up to 2 tons go out from the big city postoffice on these motor trucks for delivery to the rural districts and on the return trip the rural parcel postman brings country produce to the city.

Weather conditions have not interrupted the service, the motor truck is light and speedy, equipped with pneumatic cord tires, it handles itself in tight places. It negotiates the rough or soft highways, fords streams, and generally gets itself around speedily and comfortably in the country districts.

The government tells the farmer to ship eggs, live poultry, fruit, vegetables, butter, milk, etc., direct to the dealer or consumer on these parcel post motor trucks. On return loads, the Postoffice Department delivers to the farmer from the city, groceries, dry goods, hardware and other supplies.

"Ship by United States Mail Trucks," the government tells the farmer in broadside posters hung all through the country district and the farmer is obeying the slogan, "Stop the Truck." A schedule tells just what time the motor truck passes his farm and he is ready with his packages. The farmer's produce is in the hands of his customer the next day after it is put on the machine. It reaches the customer at a small expense, fresh and in good condition. It means more business for the farmer, helps to reduce the high cost of living, saves time and allows the farmer to increase his output and decreases waste, as well as eliminating excessive handling and damage.

District school houses have been established as regular stations for some of the rural parcel post motor trucks so that the

Country store shipping center for parcels post.

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Mailing eggs via postal truck from school house.

Peaches also taken as mail.

farmer who does not live on a main highway can send his packages meant for the motor truck to the school house by his children or else he can bring them down to the school house when bringing his children to school.

The county mill takes advantage of the parcel post motor truck. One, two or more sacks are sent through Uncle Sam's mail in this fashion. There is no waiting for a local freight train to come along, no special heavy crating to do as when the sack is sent by express. A mill man said: "Put it in Uncle Sam's hand to-day and a sack of flour is bread to-morrow."

Efforts are being made by Fourth Assistant Postmaster General Blakeslee to have the routes extended to other states. If the present session of congress does not approve of it, it is only a question of time when the money will be forthcoming as it is a revenue producer for the postal department as well as a public necessity for the rural districts. The motor trucks are available, as the government has a large supply on hand.

Illustration of actual savings to the consumer as a result of transportation via the United States Parcel Post Routes are cited direct from postal reports as follows: On a trip from Warsaw, Virginia, to Washington, D. C., 1-ton Commerce motor truck, distance 248.4 miles, 36 crates, 1080 dozens of eggs used as a three-fourths part load, postage $22.32. The eggs cost 52 cents a dozen laid down at the market, the prevailing price to consumer for eggs (not strictly fresh) was 62 cents a dozen; the consumer saved $108. The eggs were strictly fresh. There is a showing of a saving of $98.34 on transportation from Easton, Maryland, of 528 combs of honey. There is another case of saving of $387 on eggs. Numerous other cases can be cited. There is not one instance in which the consumer was not saved where goods were transported via Uncle Sam's motorized parcel post service.

Slow Deliveries Injure American Motor Truck Market in Spain

There is a constant demand for motor trucks in the Province of Seville, Spain, due to the prevailing system of hauling by mule cart. Practically all the olives, cork, wine, etc., that are shipped through this port must be hauled from warehouses and orchards in the surrounding country, and as the mule carts can carry but two casks of olives or wine at a time, many trips must be made before a shipment is ready on the docks. It is felt that one motor truck could do the work of at least 10 mule carts, effecting a saving in time and labor, and insuring the shipper against the uncertainty and inconvenience of the present method, which, due to innumerable strikes of the carters, has been found most unsatisfactroy.

In fact, $250,000 has been subscribed by local merchants for the purchase of American motor trucks, this amount to be doubled later. Dealers have orders for over 100 motor trucks, and the orders have been placed in America. Shipments are not arriving, however, and it is felt that unless something is done to facilitate deliveries local dealers will be forced to buy in England or Germany as soon as it becomes possible for them to do so. There are only 32 motor trucks in the Province of Seville. There are 978 automobiles, 14 motor 'buses, and about 100 motorcycles.

Birkett Now with Paige

The Paige-Detroit Motor Car Company announces the appointment of W. G. E. Birkett as advertising manager of the motor truck division. Mr. Birkett recently has been in charge of the national advertising of the Burroughs Adding Machine Company.

Postal truck speeds flour to market.

The old and the new way.

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Small Dealers and Co-operative Trucks

Indianapolis Retail Dealers Favor Plan of Adopting Co-operative Buying of Delivery Trucks; Many Are Interested in Proposition

THE business world at large is pretty thoroughly convinced of the utility of the motor truck, and since the war and the ending of restrictions of all kinds, nearly every industry has bought freely of the motor truck. There are still many business men who realize their need of a vehicle of this kind, but who are unable to see their way clear to invest just now, or even in the immediate future. Singly, such men are unable to buy a machine. If however, others in their line were to become convinced of the practicability of purchasing a motor truck as a coöperative measure, the sale might be made.

A good illustration of this is the retail shoe business. Relatively few exclusive shoe stores are able to operate their own machines for delivery purposes, not having the necessary volume to justify the outlay. Various makeshifts are employed for delivery purposes and the small shoe retailer has struggled along under this handicap as best he could. For instance, one shoe man, in Indianapolis, with whom the writer is acquainted employs the services of a boy for delivery. This boy does not even have a bicycle but uses the street cars. Every bundle to be delivered costs this dealer ten cents carfare, plus cost of the services of the boy. There are other disadvantages. In the spring and fall, when business is heavy, this boy is unable to make deliveries promptly.

This retailer admits that he would welcome a coöperative plan. If other shoe men in that city were to show any willingness on the motor truck proposition, this dealer would be glad to contribute $500 or so to the purchase of a light delivery wagon, which would call at each store twice a day for bundles and make quick deliveries.

HOWEVER, speed is not regarded as a requisite by all business men. Department stores, in many instances, at least, are inclined to frown on too extravagant demands from the public. One such store with which the writer is acquainted makes a charge of ten cents for all bundles delivered the day purchased. No charge is made, of course, for delivery on the following day.

The paper field is hardly as promising as the shoe business, as far as coöperative sales are concerned. Every big paper house maintains a sale office in cities of importance in that territory. For instance, the Graham Paper Company, a big jobbing house of St. Louis, has salesmen in Cincinnati, Louisville, Indianapolis, and other cities in the Middle West. These salesmen are forced to use trucking services for deliveries, and they are not always satisfied with the way their business is handled. Talk of coöperative buying of a motor truck has been heard frequently among this class, but a big drawback has been that consent from the home office would have to be secured before the plan could be put into operation. Another possible obstacle might be a loss of good will among the transfermen, who might complain vigorously over this plan of action by motor truck salesmen. Such objections could not be registered in the case of shoe men, who are not using motor trucks now.

Florists are much in the same predicament as shoe men. They have many deliveries to make, and can not always afford to buy a machine—or at least, they do not feel that they can. The boy and the street car or bicycle are frequently used by florists, though many of the larger ones do operate motor trucks.

There are other small dealers who might gladly enter into a coöperative buying plan such as that outlined. One odd suggestion came from a haberdasher to whom the subject was broached.

"I THINK it might be worked," he said, "but on a somewhat different basis than that you have outlined. For instance, I would not show much enthusiasm over buying a motor truck with my friend, Jones, in the same line down the street. In fact, I do not believe a shoe dealer would care much about going in with other shoe dealers. While I might not want to go in with Jones, who is in my own line, I would have no objections to coöperating with Smith, the shoe man, and White, the florist. In short, I believe a combination of three or four dealers in different lines would take better than one of the same number of men in the same line.

"If four shoe dealers bought a motor truck on a coöperative basis, for instance, a question would be as to what name, if any, should be put on the motor truck. They would not be willing to forego the benefit of the advertising by leaving the sides of the vehicle blank. And if all of the names were inscribed, it would look funny to the public, which is not any too fond of the shoe trade just now, with prices as high as they are. Imagine a sign: 'Jones Shoe Company, Brown Shoe Company, Wilson Shoe Company and Edwards Shoe Company,' on one motor truck. It would not do.

"But a sign like this would be perfectly acceptable to all who might see it: 'Delivery truck of Carter, the Haberdasher; the Jones Shoe Company; Dudley, the Clothier, and White, the Florist.'

"'Good idea,' the average business man would think. 'Those chaps were clever enough to band together and get a motor truck and some advertising with it.'"

Speaking of coöperation, the laundry field provides a good illustration, though not quite along the lines under discussion. Laundry owners throughout the country are adopting the five-day plan of delivery. which, at first sight, looks like a backward step. It is necessary for the majority in each city to utilize the new plan in order to make it a success. The old way was to deliver in two or three days.

Under the new system, each laundry divides the city into five districts. One district is visited daily by the motor trucks of each laundry. No coöperation is attempted in this division of the city, nor in fixing the days on which the motor trucks of any given laundry will collect or deliver laundry in that district.

The Excelsior Laundry might district the city in such a way that its drivers would enter the same section Monday morning as those from the Faultless Laundry. But this is immaterial.

The virtue of the plan lies in the fact that it eliminates the peak load. Formerly, everyone wanted to send his or her laundry out on Monday. As a result, 90 per centum of the week's business came into plants on that day, resulting in a terrific strain on facilities for the first two or three days of the week, and an equally noticeable lack of business the last few days.

NOW the load is evenly distributed. A laundry visits a certain district on Monday, another on Tuesday and so on down the line. Motor trucks bring in the same amount of laundry every day in the week. It is worth noting that laundry is collected in the afternoon and delivered in the morning. For instance, a bundle collected Monday afternoon is returned Friday morning. This means, among other things, a tremendous improvement in collections, since housewives are usually at home in the morning and pay for the laundry which is delivered. If they wish to send their laundry away in the afternoon and also desire to go shopping, they may leave the bundle outside of the door, or in any other designated place. Collections have improved to such an extent under the five-day delivery plan that laundry owners in many cities have practically eliminated all credit, and are deciding to make the no-credit rule ironclad.

The five-day plan has had its result on the motor truck business. It is obvious that not as many motor trucks are needed as formerly. Laundry owners in many instances are keeping the same number of machines and drivers, setting aside one day a week in which each motor truck is to lie idle and undergo an inspection. The establishment of a cash system also makes the laundry owner a much better prospect than formerly. In fact, laundries are one of the best prospects for motor trucks, and one or two are trying out trailers at this writing.

Nearly four per centum of the world's cotton production for 1920 will be used in the manufacture of pneumatic automobile tires—a total consumption of approximately 400,000 bales.

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Need of Specifications for Oils

Selection of Lubricants Even by Best Engineers Is Problem Holding Many Uncertain Quantities; Are Forced to Depend on Well-known Brand Houses

THERE is one feature which is common to all the infinite varieties of mechanism with which the engineer has to deal—namely, the necessity for lubrication. Yet, in spite of the fundamental importance of the subject, the principles of lubrication have, until recently, received but scanty attention at the hands of scientific men.

It is true that Beauchamp Tower studied the action of oil in a bearing and Osborne Reynolds developed a mathematical theory based upon his experimental results, but it is not derogatory to the work of these and other investigators to say that the present state of the art of lubrication is far in advance of any scientific theory. The engineer has found out by experiment what kinds of oil or other lubricant give the best results under various conditions of use, and in what circumstances satisfactory lubrication is possible at all; yet as to what constitute the determining factors in these cases he is almost entirely in the dark. Enlightenment as to the nature of these factors is required not merely for intellectual gratification, but for the severely practical purpose of improving our machinery. If we knew upon what lubrication ultimately depends and understood the molecular mechanism by which it is accomplished, it might be possible to devise lubricants or bearing surfaces which would permit of vastly greater working pressures than are now permissible, with a consequent revolution in the design of machinery. A wide and almost untouched field of research lies open to the physicist and the chemist, the exploration of which would benefit the engineer in a very direct and practical manner.

THE primary function of a lubricant is to make surfaces slippery, so that they may slide over each other with the least amount of frictional resistance. The usual lubricants are, of course, oils of various kinds, and R. M. Deeley, an English engineer, in a communication read at a recent meeting of the Physical Society, refers to the specific property of liquids, in virtue of which they reduce friction as "oiliness." This hardly seems more illuminating than the definition of an archdeacon as a man who exercises "archidiaconal functions." Moreover, it appears either to beg the question or to be misleading. For example, one of the slipperiest substances known, and one which is always associated with ease of sliding, is ice. It is generally assumed that the "lubrication" which makes ice so slippery is a minute film of water caused by the momentary liquefaction of the ice under the pressure of the sliding body. At any rate, whether this is so or not, there is nothing about the phenomenon which would justify such a word as "oiliness" being used in connection with it. Water is said also to make a good lubricant for surfaces of ebonite, and it serves to lubricate the sterntubes of steamships. It is, however, quite inadequate for ordinary metallic surfaces for which universal experience indicates some sort of oil or grease to be the only practical lubricant.

Why oils possess the property of lubrication in so marked a degree, as compared with other liquids, is something about which we are still awaiting an explanation from the physicist. Moreover, oils which are for all practical purposes identical in viscosity and other characteristics prove to be of very varying merit as lubricants. It has been suggested that to be a good lubricant, any oil, whether of organic or mineral origin, must contain a number of unsaturated molecules which attach themselves to the metallic surfaces by their residual affinities. Thus the interface between the solid metal and the oil film is looked upon as being composed of a sort of alloy or amalgam of oil and metal, which prevents the oil film from being rubbed away. The necessity for unsaturated molecules is, however, denied by other authorities, and there the matter rests. What does seem to be certain is that good lubricants appear to have the power of attaching themselves strongly to the rubbing surfaces, and of retaining their adhesion under very considerable shear stresses.

THE engineer is quite content to wait until the physicist and chemist have come to some agreement with regard to the molecular explanation of lubrication, but he is pressing them for some practical guidance which will help him to decide upon the suitability of an untried sample of oil for some particular purpose. To make an actual test of a new kind of oil upon an important machine, such as a gas engine or other motor truck parts, is an expensive matter, and is not without a certain risk of injury to the machine. The engineer consequently is tempted to bear those ills he has rather than to risk incurring others that he knows not of, and he therefore often continues to use a high-priced oil for fear of experimenting with a cheaper one. To add to his difficulties, the salesman of the new oil may claim that it is identical in character with that which he desires to supplant, and may point to the fact that as regards viscosity, flash point, fire point, and other features the two oils are undistinguishable. Every engineer who has purchased oil on a large scale must have had experience of this kind, and many a one has found that the cheaper substitute fails in just the feature which is essential—namely, the power to lubricate efficiently.

When oil has to be purchased by tender this ignorance of the factor upon which lubricating power depends is a serious matter. The buyer can not protect himself by requiring bidders to conform to any specification, however rigid, because in the present state of our knowledge it does not appear to be possible to draw up a specification which will insure that every oil which conforms with it shall be a good lubricating oil. In more than one case an oil company has been asked to furnish a specification of some of its oils which have proved satisfactory, the specification to be so rigid that none but oils absolutely identical with its own could satisfy it. In spite of a promise to the company that tenders would be called on such a specification, thus practically throwing a valuable contract directly into its hands, the specification was never forthcoming. It appears that all the engineer can do at present to insure uniformity of quality of his lubricating oil is to purchase some brand under a trade name, and trust to the honesty of the sellers that the name shall always connote the same quality. This is unsatisfactory in the last degree, and matters can not be improved until those who preach to him the duty of conducting his business along scientific lines will furnish him with specifications and methods of testing which will place the purchasing of oil on a more scientific footing.

THERE have been on the market for many years various machines designed to test the lubricating qualities of oil under conditions comparable with those under which it is to be used. In the more elaborate of the machines tests may be made of the friction occurring at various speeds, temperatures, and pressures, and autographic records may be obtained of the variation of friction with time. These testing machines do not, however, command the general confidence of engineers as a guide to the merits of an oil. None of them, so far as is known, can provide conditions even approximately resembling those which obtain in a gas engine cylinder, steam cylinder, or turbine bearing. Moreover, the results obtained by different machines are not comparable, so that oil can not be bought on the guarantee that it will give certain results in a testing machine. The utility of the machines really consists in enabling the engineer to test different samples of oil for similarity of behavior under similar conditions, or to compare periodical tests of the same brand of oil with one another. They have a certain scope for these purposes, but the relationship between the figure of merit they would award any particular oil and its real merit in practical use is by no means definite.

What an engineer usually wants to find out is whether a new sample of oil offered him is better or worse than that which he is using. There would, therefore, seem to be room for a simple machine which would indicate the differential fric-

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tion between two similar pairs of surfaces working at precisely the same pressure and temperature, and lubricated, one with the sample of oil to be tested and the other with the oil in ordinary use. It is true that it would not be possible to imitate the actual factors which influence the life of an oil, such as the presence of steam or flaming gas, but nevertheless the ease of making a simultaneous comparative test of two oils under necessarily identical conditions would be worth something.

Without minimizing for a moment the scientific interest, and no doubt also the ultimate practical use of the investigations now being carried out, as to the real explanation of lubrication, it may be suggested that work of a more immediately useful nature lies ready at hand. If, without interrupting the researches now being made into the physical basis of lubrication generally, specifications for oils suitable for certain difficult conditions could be compiled they would confer an immediate benefit upon engineers.

New Motor Giant Gluts Snow Faster Than Mother Nature Can Sift It

The big snow storm in New York brought out some strange snow-removing devices, and the inhabitants as they plodded through the trolleyless streets found entertainment in watching the operations of the new appliances.

One piece of snow-removing machinery which came in for much attention was a 20-ton motor truck equipped with mechanism which enabled it to eat its way into a snow drift, the snow being carried up into the body and then ejected down a chute to the gutter or to a smaller motor truck running alongside.

The National Snow Removing Company, owners of this machine, stated that the tests showed it capable of removing 9 cubic yards of snow a minute, and able in a single day to do the work of 1,000 men. It will travel, say the owners, 5 miles an hour in from 3 to 4 feet of snow and will make a clearance 11 feet wide, throwing the snow 20 feet clear of the motor truck. The machine is mounted on 40 by 12 United States solid tires, and each tire is made to carry a load of 5 tons.

Truck Use in Leading Trades

A section of more than 100 pages in the 1920 edition of the POWER WAGON REFERENCE BOOK is devoted to studies of the use of motor trucks in various leading industries. The methods employed by well-known operators are treated and are accompanied by the signed statements of owners telling of their experiences with motor haulage. All but a few of the studies include elaborate tabular data, showing the number of motor trucks in use, their value and distribution, and the number of owners. An additional feature of value will be found in the figures showing the number of concerns engaged in each industry treated. Other tables show the yearly gowth in the use of machines, and the number and percentages of each size employed in 1919.

City Traffic Will Demand Truck Freight Terminals

CONGESTION WILL FOLLOW IF NOT BUILT

Freight terminals designed and operated exclusively for motor trucks in the large cities of the United States will be the next stage in the development of highway transportation, according to R. E. Fulton, vice-president of the International Motor Company.

"With appropriations that have been estimated to total nearly a billion dollars available for building roads in 1920, it is only necessary to enlarge highway construction facilities before we will have a comprehensive network of these trade arteries that will bring goods from hitherto undeveloped territories into large cities," said Mr. Fulton in a recent interview.

"It must be remembered, however, that with this increase in the number and capacity of highways will come increased demands upon the traffic resources in cities and that the result will be serious congestion unless city traffic facilities are increased to offset the effects of outside highway construction. Since it is practically impossible to build more city streets or to widen them, it will be necessary to distribute freight more efficiently. This can be done by establishing motor truck freight terminals for handling small shipments, similar to the railway terminals, each to serve as a clearing house where outgoing and incoming loads can be assembled and distributed. Such a system implies the coöperation of the motor express concerns both in delivering merchandise and in obtaining return loads.

"Operated either by private concerns or reciprocally by the express concerns themselves and located on the outskirts of cities, these terminals would eliminate the expense and congestion involved in delivering and calling for small consignments. Their method of operation would be to receive motor truck loads that are made up of several consignments and to deliver them on definite organized routes to the consignees. They would not, of course, handle loads in which the full capacity of the motor truck is taken up by one consignment because this type of haul can be handled better without using terminals. They would be confined to delivering and calling for small shipments where much duplication is ordinarily to be found.

"Motor truck freight terminals would thus be a benefit to both the motor express concern and to the city, to the former by lowering delivery cost and insuring return loads, and to the latter by providing a means for offsetting traffic increases."

Tractor Specifications

Detailed data concerning several hundred farm tractor models of current design are included in a large section deyoted to power farming in the 1920 edition of the POWER WAGON REFERENCE BOOK. Supplementing these data are blue-prints showing side elevation and plan views of leading tractors, and an authoritative article on power farming by Professor Earl A. White, treating the design, application and use of farm tractors.

Triangle's New Angle

The addition to the plant of the Triangle Truck Company, of St. Johns, Michigan, is expected to be ready for occupancy shortly. During the last three months the Triangle company has established a number of new agencies and all are doing business. The Saginaw agents sold eight motor trucks the first two months after signing their contract.

Small shipments that could not be hauled to market profitably by producers can be sent by motor express in many sections of the country. The motor express is an evolution, the full value of which will increase from season to season.

Monster snow plow on 20-ton chassis.

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Trucks and Trailers in New Orleans

By JOHN B. WOODS

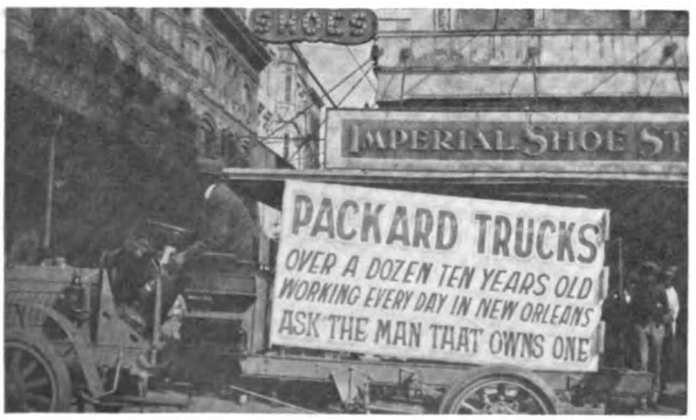
DOWN in New Orleans a few weeks ago they held a motor truck parade, led by the Mayor and several pieces of motorized municipal equipment, such as fire engines, street cleaners, dump-cars and the like. The line was two miles long and jammed the streets at a score of busy crossings during the noon hour, while thousands of people watched with interest and policemen cursed fervently. Apart from the unavoidable lateness and consequent misfortune of the hour the parade was a great success, and to anyone interested in motor trucks was full of meaning. For one thing there was a new FWD motor truck equipped with pneumatic tires and a stock rack, in which rode a white horse. The message on either wall of his pen was the old story of "Good-Bye Horse."

THERE were almost as many used motor trucks in line as there were new, and trucks in line as there were new, and among these latter were several with records of from five to ten years' active and satisfactory service. When a concern buys a machine and operates it eight or ten years and then is able to put it into a parade and display it as a worth-while example of motor effectiveness, showing up to advantage among brand new equipment, such a concern is apt to be strong for trucking and capable of giving good advice to beginners. The Packard people came out with a statement that "Over a dozen, ten years old" were working every day in New Orleans. Such truths are worth considering, for many of us are prone to think that motor trucks are things of great cost and upkeep, capable of running smoothly and doing great things for a few months, after which they must be charged off and sold for scrap, while new machines take their places. Of course, the life of a motor truck is not guaranteed by its makers to be three years or seven. The human element comes so strongly into the proposition that nobody can foresee how long a given machine will perform satisfactorily. Of two hauling units delivered at the same time one may be given over to a careless driver and become a continual source of trouble and repair bills until its owner gives up in disgust, while the other may attain a ten-year record of constant service and low upkeep. Hauling conditions and such factors as climate figure large in the performance records, of course, for heavy grades and bad streets or poor country roads mean almost exclusive use of low gear and consequent uneven wear as well as low speed records. It may be granted that if given half a show a motor truck will deliver service that is far and away beyond animal-drawn transportation, and with favorable conditions of road and grade and driving ability it will keep on doing this indefinitely.

CONSPICUOUS among the exhibits were trailers, both used and new. Several companies sent hauling units, made up of motor trucks and trailers, loaded with their particular articles of trade. A big mill and lumber retailing company sent out two units drawing long, specially built trailers upon which were loaded yellow pine timbers that in these days of shortage are worth almost their weight in gold. Cotton drays were there, with their sloping platforms and high spring couplings, fastening upon the motor truck immediately above the rear axles. Some motor trucks drew behind them trains of two or more 4-wheeled trailers, with hard rubber and heavy pneumatic tires. Others carried their 2-wheeled trailers hanging literally upon their backs. But really the trend of the times toward auxiliary hauling capacity without greater motive power was plain to be seen there on the streets of the river metropolis. There is another trend to be recorded as well, that of buyers and manufacturers alike to strive to develop special types of equipment to handle special kinds of service, as for example side and end dumping bodies with strong winches for their operation. It is because of these various suggestive exhibits that I have dwelt at length upon the parade. It was nothing of great moment in itself, merely the result of planning by live and enthusiastic dealers, but as a matter of history it did amount to much, for one could stand upon the curb and visualize the modern commercial life of a great city. A few years ago we were all more or less skeptical of motor trucking. To-day most of our great cities have adopted them and adapted them to the special needs of climate, street traffic and business, and in turn have been made bigger and busier by the new mode of transportation.

The lecturer who stands in the bow of the good ship Sidney, megaphone in hand as she plows through the muddy waters of the Mississippi River, and orates about the fourteen miles of steel and concrete docks, "Owned by the city, gentlemen, all owned by the city," is authority for the statement that New Orleans has attained the distinction of being second only to New York in exports for the past two years. Such a volume of foreign trade spells great movements of traffic through the streets as well as along the railways. And beside the ocean trade there is the old river's share, coming and going up the low paddle-packets which dock at the foot of Bienville Street. Back of the warehouse there is a great paved space where barrels of sugar and bales of cotton are dumped when the roof will not suffice to cover all that comes in. And here on any day one may see dozens of motor trucks with their trailers, coming up light and going away under load or coming loaded to go away light, as the case may be.

FROM the biggest sugar refinery in the world come the great sugar drays, six wheels and a long wide platform, sagging in the middle under a quadruple row of brown sacks. The subsoil of New Orleans is unstable because of river sand and the very earth is felt to tremble when some of these loads rumble across Canal Street down near the river front. But whether they carry twenty bales of new cotton, five hundred pounds to the bale, or a moun-



Aged trucks grace New Orleans parade.

Horse given lift by conqueror.

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tain of fresh grown coffee out of Brazil for roasting in the coffee houses, the motor trucks keep going. Not so very long ago the brewers' drays were to be seen in the continuous cavalcade, but nowadays one does not see them.

The name of Jahncke is well known in the city and stands for big business along several lines. There are shipyards and marine repair docks. Also this firm handles a great volume of contracting work, especially in sand and gravel. One night I was walking along St. Charles Street just about the time when people were catching the cars to go home. I stopped before a vacant lot where building is in process and as a big gray motor truck drove up with a load of sand I stayed to watch, for it could discharge only in one spot, and that meant that all street car traffic would be interrupted during the unloading. As the negro driver backed into position a car came along, the motorman scenting a delay and stamping angrily upon his gong. But the negro never stopped to be scolded or cursed. He threw his clutch, hooked it in neutral, jammed on the emergency brake and with a quick motion started his winch. In exactly one minute his load of sand was on the sidewalk and he was pulling out for the garage, while the car came on with only the most trifling delay. Such efficiency spells business and dollars to big concerns and the people who are buying big steel drydocks to put New Orleans on the map as a port for ship repairs also are buying fleets of specially constructed motor trucks to handle their land business.

Construction work is going on constantly about the magnificent dock system, a matter of steel girders, concrete and its companions—sand and gravel—and long cypress piles to hold up the former. Very often the builders have occasion to haul through the crowded streets these sticks of timber, fifty feet in length. They mount one end of their load upon a 4-wheeled motor truck, with bunk over the rear axle and proper tackle for holding the load. Then they swing the other end upon a 2-wheeled trailer far to the rear and travel slowly but usually without mishap.

One might go on indefinitely, recounting the different types of motor equipment in use on these streets. Light cars for the stores, trailers for heavy work and special machines for special tasks, all are to be seen constantly. The city is growing in size and carrying on an ever increasing business as it grows. What they could do if there were no such machines available is difficult to conjecture. Certainly they would be handicapped seriously. And this traffic is handled over streets that are paved with cobblestones upon more or less secure foundations and crooked and narrow often beyond belief. The wear and tear is above the average.

But climatic conditions are favorable for efficient gas-engine performance. There is neither cold nor snow to contend with, which is fortunate alike for cars and drivers. Storms that come in the night to leave several inches of snow for the motor trucks to plow through next morning are unknown. Ice is almost unknown, although there is an abundance of rain water. But the warm weather which gives gas engines their best working conditions is there almost the year long. In fact, this feature probably is overdone. But, anyway, New Orleans is a motor truck town and respected accordingly by all distributers of such equipment.

Warns Railways of Industrial Slump in Shortage of Freight Carriers

At a traffic meeting in Detroit, January 29, representatives of the United States Railroad Administration were informed that unless relief through better car supply was furnished at once, factories would be compelled to lay off more labor and possibly result in a complete shutdown of some plants.

In anticipation of orders for new cars by railroads it was decided to make an active campaign for having them equipped with large doors, or double small doors, suitable for handling automobiles. This will be brought to the attention of all lines and it is believed that the large volume which automobile traffic has attained (300,000 carloads in 1919) and the amount of business lost to the carriers through lack of cars and consequent drive-a-ways (40,000 carloads in 1919) will add more force than heretofore to this contention.

Adverse operating conditions beginning with the coal strike and followed by continued severe weather East and West, labor conditions and forces depleted by illness, embargoes, shortage of coal and power notably for switching service, are given as the immediate causes of slow movement and consequent car shortage which is now affecting all industries.

Railways Must Increase 25 Per Cent Over Demands to Avoid Congestion

Until the railroads are at least 25 per cent greater in area covered and the number of units employed than the combined demands of the nation, congestion will always appear imminent.

Due to elasticity and ability to operate over different kinds of roads and not having to confine its area over a certain prescribed route, the motor truck by reason of its elasticity does not have the danger of congestion to interfere with its operation.

Motor loading stations need never be congested because they can be loaded every place, even right at the door of the consigner. They can be loaded at any corner without special platforms. Then again, the operating area of a motor truck need never be congested—they do not all have to follow the same road or highway even if they are all going to the same destination. They do not have to wait on a side line for other motor trucks coming in the opposite direction to pass them; they do not have switches and other paraphernalia necessary to an efficient operation of the railroads to hold them back or hinder their performance. This efficiency of the motor truck, its elasticity of operation, is one of the big points that transportation unit has over any other mode of travel.

Reduce Mileage; Save Costs

By re-routing 77,669 freight cars, one railroad saved an average of 155 miles per car. Likewise, it has been proved that operators of motor truck fleets by carefully studying the highways leading to shipping destinations can effect a saving of from 20 to 28 per centum in mileage and time. This saving, of course, lessens depreciation and operating expense. There is no reason why every motor truck owner or operator can not reduce mileage and time to some extent by studying routes and highway traffic.

Guide for Body Builders

Elaborate data of great value to motor truck body builders are included in a section of the 1920 edition of the POWER WAGON REFERENCE BOOK devoted to motor truck bodies. In addition to illustrated descriptions of all types of bodies and hoists, there are valuable suggestions on body painting and design. All important chassis dimensions required in the construction of special bodies are given, together with the body weight allowances determined by the various motor truck manufacturers.

Official Report Showing Standing of 12 Tractors in Lincoln Trials

After an interval of more than three months the technical committee responsible for the tractor trials held at Lincoln, England, has published its official report. In addition to comments on the individual work of the tractors entered for this event, the report tabulates awards under six different headings, these covering all the practical tests to which the machines were subjected. The accompanying figures, extracted from the official report, show the work of twelve of the best tractors taking part in this competition.

LINCOLN, ENGLAND, TRACTOR TRIAL RESULTS.

Name of tractor.	Heavy land. Estimated number of acres ploughed per 8-hour day.	Heavy land. Cost of fuel per acre.	Cliff land. Estimated number of acres ploughed per 8-hour day.	Cliff land. Cost of fuel per acre.	Sustained pull at ploughing speed in pounds.	Efficiency of adhesion per cent.
Austin	5¼	.99½	6¼	.53	.....	..
Clayton	6¼	.75½	6¼	76	3,500	56
Fiat	6¾	$0.77	7¼	$ .50½	3,550	59
Fordson	3¼	1.45	6	.77	1,500	93
Garner	3¾	1.68	6¾	.98½	1,900	70
Gray	6¼	2.41	6¾	1.25	3,800	76
Illinois	2½	1.97½	6¼	.76	.....	..
Mann	4½	1.44	8½	.52½	4,700	67
Moline	3¾	2.91	6	1.21	1 600	47
Omnitractor ...	3	1 21	6½	1.25	3,200	58
Saunderson	3¾	1.72	5	1.23½	2,700	59
Saunderson	5¾	1.20	6½	1.21½	.....	..

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San Francisco Offers Educational Features for 1920 Truck Show

San Francisco will be in carnival dress in honor of the fourth annual Pacific Auto Show which will be held at the Exposition Auditorium the week of February 21, the most elaborate and representative event of the kind ever undertaken in the western country.

Amid a setting as colorful and as brilliant as the carnival affairs of pre-war days the show this year will be a distinct novelty, and Manager G. A. Wahlgreen, who is directing the plans, has arranged a program that will appeal to all persons interested in the motor industry and to all lovers of the California "out-of-doors."

Motor experts will give daily talks and demonstrations on the newest motor devices and uses, and all emphasizing the trend of the industry through war-time control. The effect of the motor truck on the development and turning of the war will be brought home to every visitor, the educational features having been arranged to demonstrate that the industry has completely changed from a war to a progressive industrial footing.

The decorative scheme for the exposition auditorium already has been pronounced by art critics to be the most complete indoor representation of the out-of-doors ever designed here. With the scenic grandeur of the ancient Grecian Acropolis setting as the motif the huge auditorium will in reality picture the California out-of-doors. Instead of detracting from the wealth of motor industrial achievements to be shown, the decorative scheme will place the motor industry in its proper setting—in an out-of-door wonderland. This is the trend of the post-war development.

Market for Motor Vehicles in Norway Expands Since Armistice

At the close of the year 1918 there were in Norway 2,612 passenger automobiles and 61 motor trucks, a total of 3,273, as compared with 3,068 at the close of the year 1917. The number of motor cars thus increased by 205 during the year. Since January 1, 1919, the number of both classes of vehicles has increased very materially.

Of these motor vehicles, 561 passenger cars, 331 freight trucks, were owned in the city of Christiania; in the Akerhus Amt (the district in which Christiania is situated), exclusive of Christiana, were 284 passenger cars and 37 motor trucks. This means that about one-third of all passenger cars and more than half of all motor trucks in Norway were owned in and about Christiania. In Bergen, the second city in size in Norway, there were 173 passenger cars and 81 motor trucks at the close of 1918.

Norway at the beginning of 1919 had 54 bus routes on which 117 motor 'buses plied regularly. These routes cover a distance of about 1,700 miles, and are mostly from harbor points to inland towns or tourist resorts. It is rather interesting to note that in the whole of Finmarken, the northern and largest administrative district of Norway, there was but one passenger automobile, and that it plied on one of these 'bus routes.

The statistics given above must not be regarded as normal. With the outbreak of the war the use of motor vehicles almost ceased in Norway because of the impossibility of getting gasolene to run them. It only revived after the signing of the armistice in November, 1918, and has hardly yet returned to normal conditions. As an indication, however, of what may be expected in this direction, it is worthy of note that while on January 1, 1919, there were only 285 motor vehicles of all kinds in Bergan, there were in this city in August, 1919, 428 motor vehicles, an increase of 50 per centum since the first of the year. The situation is undoubtedly about the same all over Norway.

300,000 Miles Represents Journeys of Patriarchial Grocery Truck

The White Company frequently has said that the life of White motor trucks has not yet been determined, and this statement seems to be borne out by the performance of truck "A," dean of the delivery fleet of the W. P. Southworth Company, grocers, of Cleveland, which has entered upon its tenth year of daily service and bids fair to emulate the example of Mr. Tennyson's well-known brook and run on forever.

While not the oldest White motor truck in operation to-day, a number of trucks antedating it in delivery, truck "A" is unquestionably the veteran to remain continuously in the service of its original owner.

It was in May, 1910, that this 2-ton machine was delivered to the purchasers, and immediately put into commission with John Jedlicka as driver. John, or "Jerry" as the boys at the store knew him, was a lover of fine machinery, and the motor truck at once became his pride. So carefully did he care for it, and so carefully was it driven, that in a little more than nine years but one slight mishap marred the record of motor truck and driver, though all of the work was performed in the midst of constantly increasing traffic perils in the growing city of Cleveland—a wonderful record which, unfortunately, was ended by the death of the veteran diver a few weeks ago. James Duffy has succeeded Jedlicka as driver of the motor truck, and bears for it much of the affection of the driver so long associated with it.

Originally the machine was used to transport goods between the Southworth Company's three stores in Cleveland, in general hauling from the depots, and in delivery service. When it was four and a half years of age, O. S. Southworth estimated, from the records kept, that the motor truck had then covered 200,000 miles. Since that time a portion of the burden once borne by truck "A" has been transferred to heavier machines which have been added to the fleet, but it has easily added an additional 100,000 miles to its record, and is to-day, according to the superintendent of delivery for the Southworth Company, "in good shape, and doing about forty-five miles per day."

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Langlade County, Wisconsin, was aided in keeping the roads open for traffic by the experimental use of army tanks, these tanks working in the snow pressing it down and opening the way for traffic.

Grocery truck that has run over 300,000 miles.

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Common Sense About Motor Trucks

By EDWARD HUNGERFORD

OF all the many modern modes of transport the most fascinating today is the motor truck. In national interest — perhaps even in national possibility—it even exceeds ships and shipping. For ships do not penetrate into the heart of Ohio or Kansas or North Dakota. Motor trucks do. The hum of their engines is heard in every corner of the land; and almost every county of its hinterland as well. It is all but omnipresent. And its warmest enthusiasts only halt their prophecies as to its future because of some unfortunate limitations of the English language.

In fact, and to put the matter frankly, I should say that the greatest danger that today confronted the motor truck as a national asset was coming from those same warm friends of it. These are the men who are already talking of successful motor truck routes from New York to Chicago or from Chicago to the Twin Cities, the Missouri River or even Denver when, as a matter of actual fact, its actual economies for use in continuous runs of more than a hundred miles have never been proved to the satisfaction of its own builders. These men not only bring ridicule upon a form of transport, which in its own fields, is without a serious rival, to say nothing of being without a peer, but they actually form a serious stumbling block to the motor truck in its own fields of greatest opportunity.

IF you were to ask me what I considered such field, I should quickly reply by saying that I never have considered the motor truck as a serious rival of the railroad—in long-haul traffic. Under stress and emergency it has done wonders—even in the long-haul. But it seems absurd to say that it can compete with the railroad under ordinary conditions—to say nothing of the extraordinary conditions which ofttimes comes in our northern winters—for traffic moving a hundred or 150 miles, or upward. The best of our modern freight trains will carry 5,000 tons—with a crew of five or six men. To move the same tonnage by motor truck would take a thousand machines and a thousand drivers. In America, labor counts. And if you ask, how about the labor that maintains the railroad track, I will reply by asking how about the labor that maintains the highways. It is quits, or nearly so. And it would take a lot of labor upon the railroad to equalize that 994 excess of labor upon the 5,000-ton motor truck train.

Yet, on the other hand, we have in this country hundreds upon hundreds of small branch railroads, whose very upkeep is almost always an embarrassment and an extravagance to the bigger roads that own them. The motor truck can do two things with these; it can either render their operation unnecessary by parallelling their service upon the highways nearby and so permit their rails to be taken up and used elsewhere or else they can substitute flanged wheels for their tires and operate themselves upon those very rails; at a vast economy in cost and a great betterment in service rendered. Moreover, for each of these branch railroads which I have just mentioned, there are at least twenty other opportunities for the establishment of feeding lines up to the main stems or the more important branches of the standard steam railroads. It seems to me that there ought hardly to be a way-station in any producing section of the entire United States which in five years hence was not served by at least one or more rural express routes; from five to ten or twenty or even forty or fifty miles in length. And scientific and efficient methods of operation for these should be studied out in experimental stations or schools with the least possible delay and laid down for the benefit of individual operators.

AND that is not all that should be laid down. The road to the motor truck is as vital as the track to the locomotive. Yet, with all our blusterings and propaganda, with all of our five or six million passenger cars, how little really good roads we have even now in this country. Out of more than $600,000,000 appropriated by the states in 1919 for this purpose only a little over $137,000,000 was actually expended. For this rather marked falldown there are many reasons given—the railroad congestion preventing the prompt movement of road-building machinery and supplies, the labor shortage, labor unrest and—politics. I think that the last comes nearest being the greatest trouble. Speaking broadly we have not as yet been able to eliminate even petty politics from our road-making plans long enough to work out a scientific and embracing national scheme of highway construction. Certain towns and localities are favored overmuch, and continue to be so favored. The butter is not spread even upon the bread. And little transportation progress results.

There are, of course, engineering details snarled in the problem, some of which are still in the progress of solution. The greatest of these involves the width of American standard highways. The most of our roads are quite too narrow for any real volume of motor traffic. They congest too readily and so raise high the factors of congestion and of actual danger. If you had ever driven a motor car after dark from New York to Philadelphia along the Lincoln Highway in the days when motor trucking between those two cities was at its height you would appreciate the fullness of this problem.

With it is connected that of the traffic through cities and the larger towns. Not only does the local traffic of these places greatly hinder and retard the vehicle bound through, but there is a certain deep-rooted and logical objection on the part of their residents to having their main streets made into through freight routes. And any large increases in motor traffic must result eventually in the planning of detour routes through or around many of these communities—to the benefit of both the communities and the through traffic operators.

THESE problems are commended to the attention of those who are making a study of the motor truck as a means of national transport. But before we are completely done with the motor truck I should like to touch for a final paragraph upon a phase of its possibilities which I think are quite equal to those of the rural express. This is its use in city streets in the solution of an increasingly difficult railroad and steamship terminal problem—"storedoor delivery" is the phrase most frequently used to describe it. The ramifications of this thing alone are tremendous. And so far any detailed sort of description must be left until another time. It is sufficient here and now to say that there seems to be little excuse for express package freight bound, let us say, from the Harlem section of Greater New York to Newark or to Paterson—ten or twelve or sixteen miles distant to go in a motor truck to Jersey City, there to be loaded into a freight car or baggage car, only to be hauled for twenty or thirty minutes to a second motor truck. Obviously, it would be cheaper, more direct, more efficient in any way to send the motor truck which took the package on at the Harlem distributing station straight through to Newark or to Paterson. In all probability only the express company's contract with the railroad operated to prevent such simple haul—and so offers large room for improvement.

This problem, as I have just said, has so many ramifications, as well as such infinite possibilities that it must be studied by itself and at another time. But it is a large factor in the problem of the motor truck in America, and a large opportunity for its advancement. The day of the motor truck is certainly at hand, and demands preparation for its coming.

Electric Truck Haulage

A very complete and enlightening article on the application, use and economy of electric trucks, written by one of the foremost authorities on the subject, forms part of an extensive section devoted to the electric truck in the 1920 edition of the POWER WAGON REFERENCE BOOK. Complete specifications of electric trucks for outdoor and indoor service are also included, together with blue-prints showing side elevation and plan views of well-known machines.

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Hawkeye Show Great Center of Farmer Interest

Rural Buyers Crowd Big Exhibition Building During Week of Motor Truck Show at Des Moines

THE 1920 Des Moines Motor Truck Show held at the Ford Building, Des Moines, February 16 to 21, in connection with the annual Motor Show staged by the motor industry of that city, was significant of the fact that the greatest agricultural country of the world surrounds the city on every side. That the motor truck has come to be one of the vital thoughts in the minds of farm owners and workers all through the Middle West was soon clear to casual visitors to the show who remained for awhile on the motor truck floor and watched the class of people inspecting the machines. They were farmers. From one end of the floor, which is a block long, to the other, at all hours of the day and night could be seen few others than agriculturalists listening to salesmen's lectures on the merits of their various machines.

Fully as many different makes of motor trucks were exhibited at the Des Moines Show as were at the Chicago exhibit, though limited floor space made it necessary to cut the number of machines in each exhibit to three or four. Every kind of a machine imaginable, up to the size limit, 4 tons, was in place on the opening day, awaiting inspection by the thousands of interested people who crowded the show day after day. From the great road builders, dump trucks, to the light, racily built speedwagon, every kind of machine had its place.

Dump trucks have improved and become more various in kinds since last year, and all of these different kinds were in evidence at the Des Moines show. This type of machine has become recently rather popular in the eyes of the farmer who does his farming on a large scale because it gets rid of bulk loads so much more quickly than other models. Bodies of dump trucks are all built of steel this year. The decreasing use of wood on all machines is a great encouragement for men buying motor trucks for agricultural work, for durability is one of the prime requisites of any machine they may buy. Most of the motor trucks of the dump type exhibited had controls for every part of machinery connected with operating the motor truck or the dump-lift in the front of the car, so that the driver can have complete control of the entire work of the machine.

The advance in the use of I-beam and round beam rear axles separate from the drive mechanism, with internal gear drive, was distinct to anyone watching the year-to-year development of the machines even casually.

Farm bodies were fitted to the majority of the complete machines on exhibit this year. Special bodies for hauling small grain, corn, live stock, and miscellaneous loads were all there in force. Grain bodies have been carried over with very little change from the wagon to the more aristocratic and more efficient motor truck. One of the special bodies exhibited was built to be changed, with very little trouble, from a small-grain body to a hayrack or grain bundle wagon. Covered motor trucks for hauling perishables were there in plenty, also.

The pneumatic tire had the inside track at Des Moines show this year. Farmers, of course, find it for the most part an impossibility to use a hard rubber tire, especially on the type of roads featured most of the way through Iowa—crown gumbo. In sizes, tires varied. Speed-wagons were mostly equipped with small, plain-tread rubber, but the larger burden-bearers were in many cases, shod with rubber rims that reached the sizes of over 40 by 10. Wheels of all sizes included wood spoke, steel spoke and steel disc, with the speed wagon coming in again with something contrasty in the shape of wire spokes.

Dealers of the city would not estimate the number of motor trucks that would be sold as a direct result of inspection by purchasers at the show. It will, however, be enormous, according to estimates that they gave in confidence. Motor truck dealers of the Middle West have come to learn that now the farm territory has been opened up as a market, motor trucks will sell themselves faster than they can be supplied. Questionnaires sent to farmers of Iowa and Nebraska showed that of all the various machines they used, their motor trucks were by far the busiest of them all.

Trailers apparently are not in demand in the Middle West agricultural regions as yet. Without a system of hard surfaced highways, and with weather conditions always uncertain, even in midsummer, the trailer seems not to have found its place, as yet, upon the Iowa farm. Should a federal system of highways afford Iowa the opportunity of having even one or two hard surfaced "trunk" lines across the state, the advent of the trailer would be an immediate result.

Forced out of the show because of elevator limitations, were the great 6- and 7-ton vans that operate a dozen "ship-by-truck" lines out of Des Moines. The fact that they were not represented left out one feature of the affair that is of as great importance, at least potentially, as any other feature of the entire motor industry in Iowa. Tons of produce are brought into Des Moines and tons of products of the city are carried back out on routes by these giant motor trucks.

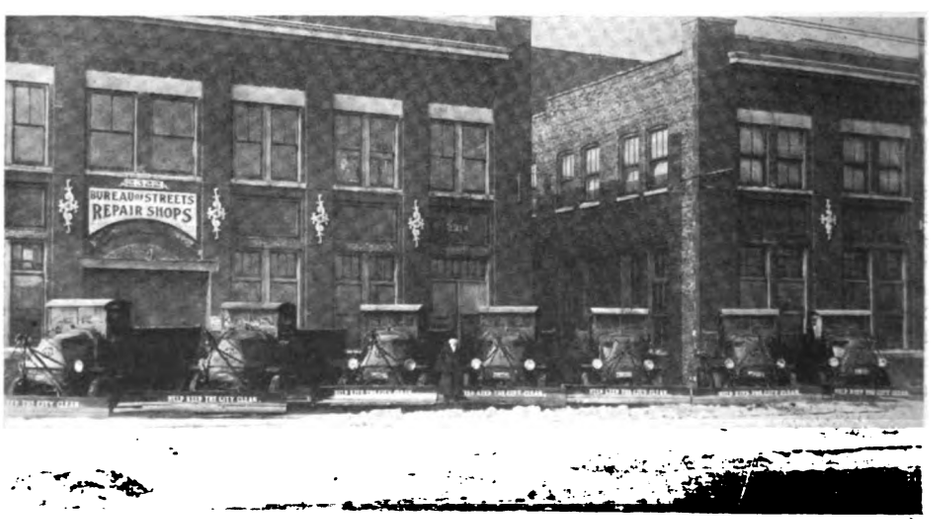
The show was inaugurated by a "ship-by-truck" parade on Monday morning, February 16, that included over two hundred motor trucks and was more than two miles in length. Included in the procession was every conceivable construction on motor driven wheels, and the parade was a good indication of the size and completeness of the show to follow.

Chicago Fleet of Snow Plows

Here is a fleet of seven Mack motor snow plows operated by the Bureau of Streets in Chicago. Their speed makes them ideal for removing the snow while it is falling. The plows are attached to the front of the motor trucks and are demountable. The motor trucks have dump bodies so that they can be utilized the year round.

Each plowshare bears the motto, "Help Keep the City Clean," and that is exactly what Chicagoans are doing—through the aid of an industrious Bureau of Streets. They realize that their expensive highways were meant for continuous service and that they will be rendered useless unless measures are adopted to remove snow rapidly in winter.

Last year 3,485,000 square yards of Chicago streets were cleaned with horse-drawn flushers and 82,380,300 square yards with motor-driven flushers. Superintendent of Streets Byrne recommends that all flushers be motorized.



Chicago's fleet of snow plows.

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Read how the manager of THE HOWARD REFRACTORIES COMPANY, Dorsey, Maryland, saved contracts by keeping his firm's busy trucks eternally on the job.

"BUT for 'NOBBY CORD' PNEUMATIC TIRES our trucks would have been useless last winter, as solid tire equipment invariably stuck in the mud before reaching our plant."

"Since July, 1918, 'NOBBIES' have served us under capacity loads of heavy fire brick and weighty materials and to date a slight nail puncture is the only sign of depreciation."

'NOBBY CORDS' mean—less operating expense — increased speed — reduction in mechanical repairs and vibrations—decrease in gasoline consumption—decrease in oil consumption—greater traction—elimination of breakages—less depreciation.

"Nobby Cords" Save in Every Phase of Truck Operation

Please mention "Power Wagon" when writing to advertisers.

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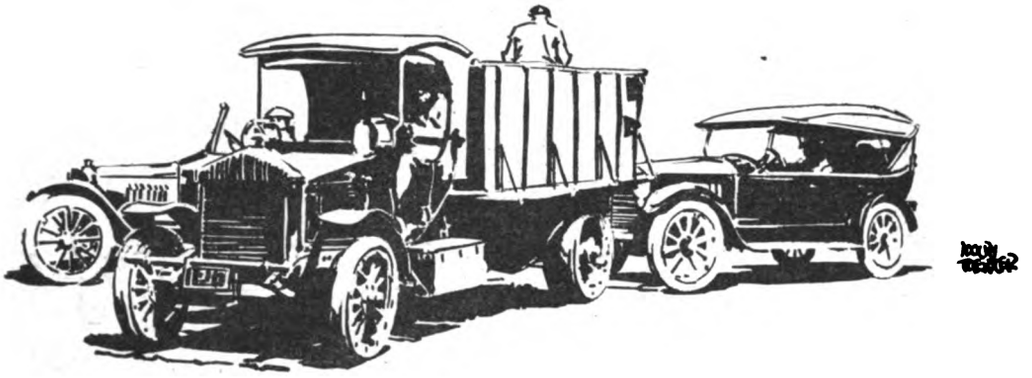

The LAW of LUBRICATION

FOR EVERY MACHINE, of EVERY DEGREE of WEAR there is A SCIENTIFIC SINCLAIR OIL to SUIT its SPEED AND CONSERVE its POWER.

THE first scientific and authoritative standard of pratice for automotive lubrication—Announced to the oil users of the world by THE SINCLAIR ADVERTISING CAMPAIGN, 1920.

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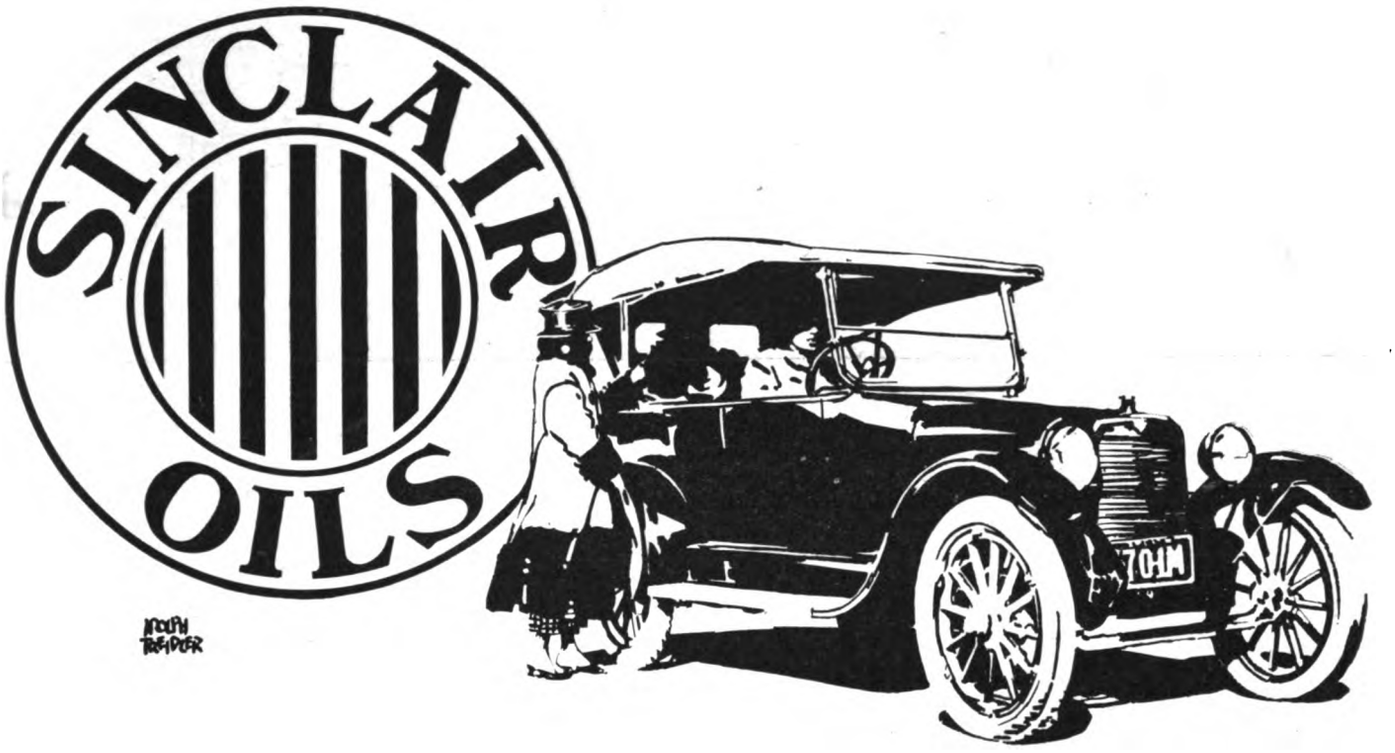

SINCLAIR dealers will be shown how to apply the Law of Lubrication to the betterment and enlargement of their business. Write for the Sinclair Recommendation Index—based on the Sinclair Law. It revolutionizes the retail oil business.

SINCLAIR REFINING COMPANY, CHICAGO

Atlanta	Denver	Louisville	Norkfolk
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Buffalo	Houston	Newark	Rock Island
Cleveland	Kansas City	New Orleans	Tulsa
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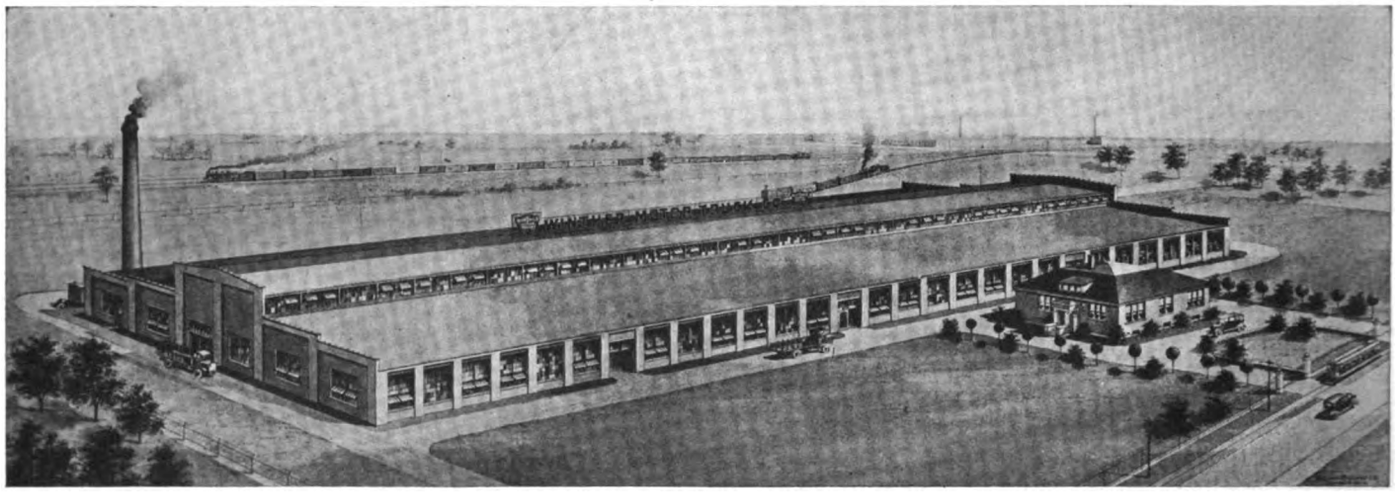

The plant back of the Winther. Large additions now building.

There Are 7 Big Dealers' Contracts Worth About $25,000 Yearly Waiting for Seven Substantial Dealers

There is a real asset back of each contract, good for at least five years. Each represents a permanent connection wherein you become our partner, and reap the benefits of a good profit plus continuous helpful factory cooperation. This help to increase the dealer's income is more than the worn out term "co-operation" implies. Let us tell you fully what we mean.

This is your chance to tie up with a sound growing organization producing one of the best trucks in America. It is your chance to build for the future with the assurance that your investment and your business will be protected and promoted.

The details of our proposition are well worth your immediate investigation. Write today for all the facts.

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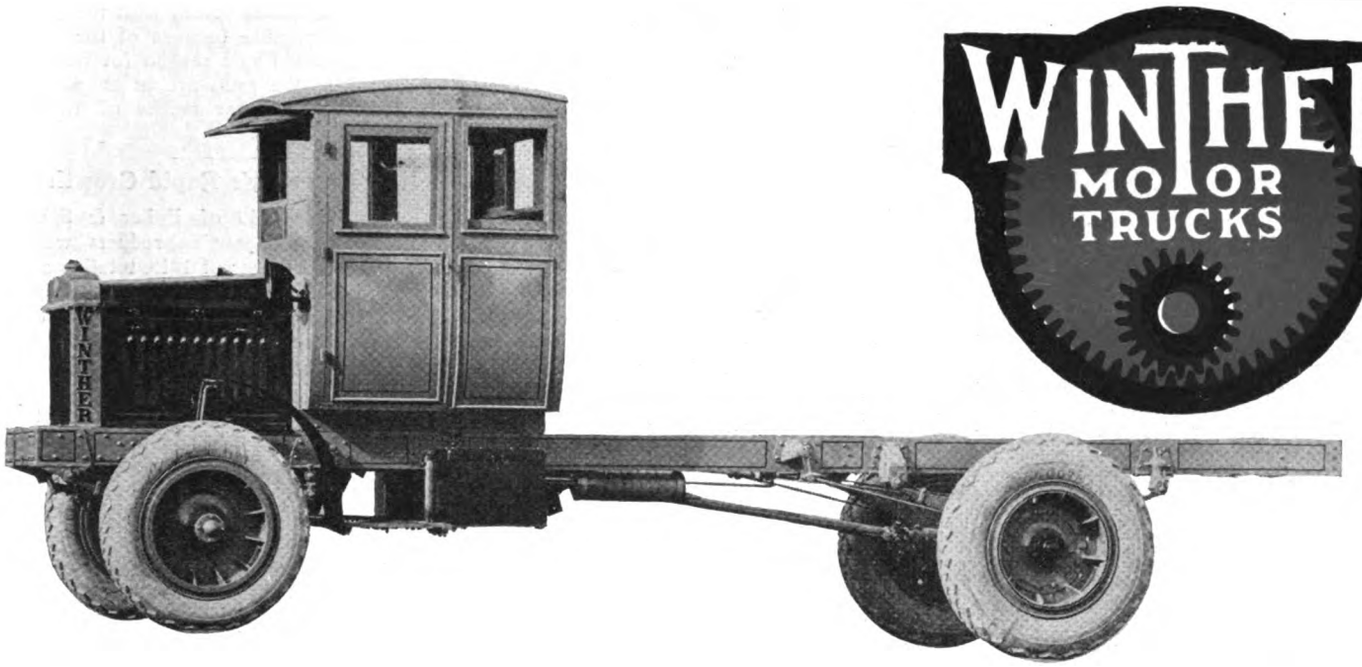

Will You Be One of the 7?

Winther has doubled production. Deliveries are on schedule. A live sales organization backs up each dealer and helps him make sales. Recently some of the most prominent sales and production executives in America joined the Winther organization.

The Winther line includes ten models, rear and four wheel drive trucks, ranging in capacity from 1½ tons to 7 tons. It is the most complete line of motor trucks on the market. It enables the dealer to sell the greatest number of prospects.

WINTHER MOTOR TRUCK CO.
Kenosha, Wis.

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Truck Business in Brazil Would Benefit Through Demonstrations

Past experiences in the use of motor trucks in the Sao Paulo district, of Brazil, have not been entirely successful, reports Consul Hoover, since the types of European machines formerly used consumed large quantities of gasolene and oil, and were therefore very expensive to run. It is believed that considerable propaganda will be necessary in order to re-establish a trade in motor trucks. Probably best results would be obtained if those companies who contemplate entering the field could send a competent salesman to Brazil, with a number of power wagons, who by actually doing the work of his prospective customer would thus demonstrate the saving in cost, and the resulting increase in efficiency. Moreover, a mechanic might be retained in the district for subsequent services needed by customers. In this way it is expected that business sufficient to amply repay the manufacturer could be secured.

Clark Axle to Enlarge

Production of Clark axles and steel wheels for motor trucks will be greatly increased with the addition of a new manufacturing plant to be built by the Clark Equipment Company, at Battle Creek, Michigan. Plans provide for a personnel of 500 men in the new plant, which will be devoted exclusively to the production of Clark axles. Axles will be machined and assembled complete in Battle Creek, the same as at the Buchanan, Michigan, plant. The first buildings to be constructed will be 100 by 450 feet and 50 by 450 feet and a separate power plant and two story office building. The same unique features of plant design and decoration which have made the Clark plant at Buchanan, Michigan, a place of parklike beauty will be followed at Battle Creek. There will also be put into force here the progressive policies of plant management and profit sharing which have proved valuable at Buchanan.

Vital Trade Statistics

Carefully collected data on the annual production of motor trucks and passenger-cars form a valuable feature of the 1920 edition of the POWER WAGON REFERENCE BOOK, which is now ready for distribution. In the new volume are given also detailed statistics of exports and imports, and the first published record of the number of motor trucks in use by states, supplemented by figures showing the distribution of these machines according to the industries in which they are used.

Passenger-car Specifications

Complete specifications of 1920 passenger-cars are included for the first time in the new edition of the POWER WAGON REFERENCE BOOK for 1920. These data describe the entire mechanism of each model in a way never before adapted on the same scale. Similar, and even more complete, information is given concerning motor trucks, farm tractors, trailers, and industrial trucks and tractors.

Success of Truck Hauling Lies in Cost Knowledge

SELLING SHOULD BE ON THIS PLAN

"Sell service and put your business on a sound financial basis by charging rates based on actual costs of operation.

This is the advice Ernest Farr, chief of the Firestone Ship-by-Truck Bureau, gave motor truck operators at the Highway Transport Conference in connection with the recent Motor Truck Shows at New York and Chicago.

Mr. Farr told motor truck manufacturers at the conference they could help the operator materially if they would keep accurate and comprehensive records on costs of operation of their machines for use in establishing rates that will make their business profitable.

In trying to secure data from manufacturers of motor trucks, from dealers in motor trucks and from users of motor trucks, he said, "there is found a very general and a very woeful lack of accurate knowledge of possible operating economics. For instance, it has been learned that nearly seventy-five per centum of motor truck owners in the general hauling business have gone broke in from six months to a year In most cases they have found no lack of tonnage; in many cases more tonnage was offered than their machines could carry. In practically every case the service rendered by the motor truck was sold for less than the cost of such service, for the reason that the operator did not know what it cost him to operate. He had not been properly informed by the motor truck dealer or manufacturer."

The live motor truck dealer, Mr. Farr asserted, realizes the importance of selling the purchaser the right type of machine for his particular needs. The tendency of some dealers and salesmen to make a sale without regard to the chance the purchaser may have to make a success of his business, he characterized as dangerous to the future of the motor truck manufacturing business. He illustrated his point by a recital of early experiences of tractor manufacturers in selling to farmers tractors of a type not fitted to their needs, with the result that the manufacturers found they had to overcome with many farmers an unjust prejudice against tractors in general.

The speaker was opposed to attempts to put the motor truck in competition with carriers already giving satisfactory service. He contended that the motor truck has a well defined field of its own that supplies a demand even greater than the manufacturers are able to meet and that the efforts of salesmen of motor trucks could be expended in these fields with far more satisfactory results than in any other.

Motor truck operators, he said, should not attempt to compete with rates charged by express and railroad companies, but rather should appeal to the shippers for work in which they can supply service unequalled by any other method of transportation. Rates that are based on competition, he held, often result in disaster to the business of the motor truck operator. Rather, he argued, the rates should be based only on the actual costs of operation plus a reasonable profit, with the preferred service possible because of the motor truck advanced as a reason for its use in cases where the rates are in excess of those charged by other means of transportation.

Fuller Company's Rapid Growth

Shipments for 1919 of Fuller & Sons Manufacturing Company's products were 82 per centum in excess of 1918, totaling almost two and a half million dollars. Shipments for January were far in excess of the 1919 average and the volume of business booked will tax the facilities of the company to the utmost.

Another four-story reinforced concrete building 60 by 100 feet has been contracted for. It will replace the old 4-story brick structure used from the start by the old company and will give this concern a plant of the most modern type, with all buildings not over five years old. A steel warehouse 30 by 100 feet has also been ordered to replace a temporary wooden one. The company is now putting in its own grey iron foundry which will start operations on March 1. It has also just purchased ten acres of land lying just north of its present plant to provide room for future extensions. The company plans to erect a large modern office building on this new land within a year and probably another large unit of the main factory will be built early in 1921.

Transport Co-ordination

An arrangement that has just been concluded by the Bradford, England, Chamber of Commerce with the Bradford Motor Owners' Association represents another step forward in the progress of road transport. Under this scheme raw material, etc., used in the wool and associated trades will be carried by motor vehicles at the same rates as are charged for goods train. This scheme, which is to be worked by the Transport Bureau recently set up by the Bradford Chamber of Commerce, will give the equivalent of passenger train service at goods rates.

Trailer Specifications

Detailed specifications of more than four hundred trailer models are included in a 50-page section devoted to trailers of all types in the 1920 edition of the POWER WAGON REFERENCE BOOK, now being distributed by the publishers. In addition to data of this kind there are given side elevation and plan view blue-prints of 2-wheeled and 4-wheeled trailers, semi-trailers and trailers of the automobile type. These are followed by an exhaustive article treating the design, application and use of trailers in various lines of business.

County Dealers Organize

At the annual election of the officers of the Champaign County, Illinois, Automotive Power Association, new leaders were chosen for the coming year as follows: President, Ray C. Sparks; general vice president, Howard Amerman; vice presi-

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dent, dealer's division, M. A. Nelson; vice president, accessory division, John C. Myers; vice president, garage and repairmen's division, H. M. Spang; secretary-treasurer, B. A. Root. It was voted to launch an aggressive campaign for new members, all dealers in the county being eligible. It was decided to carry on a campaign in the newspapers in the way of education in traffic laws and other matters affecting the motoring public. It was also decided to give a show of motor vehicles in the gymnasium at the University of Illinois, March 3, 4, 5 and 6. A proposed coöperative arrangement for the disposal of used cars was discussed. It is desired to rent a suitable building in which all members of the association can place their second hand cars for overhauling, painting and selling. In this manner, all of the used cars taken in by the dealers of the county can be disposed of at the single depot, thus saving space and time for all members of the association.

Motor Truck Parts

Illustrated descriptions of parts and equipment for motor trucks form a very important part of the Reference Text Section of the 1920 edition of the POWER WAGON REFERENCE BOOK, which is now being distributed by the publishers. Leading examples of parts, such as dead and steering axles, bevel-gear axles, internal-gear axles, worm-gear axles, engines, transmissions, carbureters, magnetos, ball-bearings, roller-bearings, etc., are described and illustrated, and equipment, such as tires, carbureters, magnetos, etc., are treated in a similar way. In the case of stock parts such as axles, transmissions and engines, specifications are also given.

Successful Glass Hauler

The accompanying picture is Sharp Partridge & Company's 2½-ton Packard motor truck, which is said to be the first successful glass machine in Chicago. The body is mounted on a standard chassis, equipped with Sewell wheels; wheel base 14 feet; frame length 16 feet. It is claimed that glass trucks have formerly been unsatisfactory as it was necessary to let down the springs and undersling the frame. Another advantage of this machine is the ease of unloading. The lower edge of the glass coming off at the normal height of a man's hand.

Truck Chassis Design

Engineers, body builders and draftsmen will find much valuable information in the 1920 edition of the POWER WAGON REFERENCE BOOK, which has just issued from the press. Chassis lay-out practice is clearly disclosed by more than 100 blueprint reproductions of motor trucks, trailers, and tractors, while the details of general design are given in the very complete tabulated specifications. Lists of makers of complete vehicles, parts and equipment are also included, as well as descriptions, illustrations and specifications of stock parts and equipment.

Motor Vehicle Market in British South Africa

AMERICAN MACHINES WINNING FAVOR

Notwithstanding the fact that statistics reveal a material reduction in the value of the imports of automotive vehicles and accessories into the Union of South Africa during 1918, the motor trade of the Union has now reached a stable state. This country is capable of absorbing annually imports of considerable value and importance.

The motor car is regarded more as an aid to business than as a luxury, although its use for the latter purpose is continually increasing. Heretofore, railway facilities have been practically the only means of joining distant settlements, and, as isolation of certain districts can not be eliminated altogether by railroads, motor wagons will undoubtedly grow in popularity.

The total imports of motor vehicles and parts from the United States for the three years 1914, 1917 and 1918 were valued at $1,066,321, $2,986,943 and $1,851,589, respectively. During these years England's trade totaled $3,059,843, $806,160 and $608,192, respectively. Canada's share of the trade rose from $626,741 in 1914 to $1,242,341 in 1917, but declined to $462,641 in 1918.

In 1917 there were 4,733 motor cars imported into the Union of South Africa, as compared with 1,663 in 1918. In 1917 the United States, Canada and England furnished 2,596, 2,099 and 36 cars, respectively; and in 1918 the figures were 1,203, 456 and 4, respectively. There were 30 motor trucks imported in 1917 and 16 in 1918; the United States furnished all but one of these.

The exact number of motor vehicles in southern Rhodesia is not known, but an informal census taken recently indicates that there were 419 passenger cars and 72 commercial vehicles in that territory.

The total white, or European population of Natal, including Zululand, is about 98,600, so that the market for motor vehicles is restricted. The number of passenger automobiles in this territory is 1,142, and the number of motor trucks for commercial use is 255. One hundred of these motor vehicles are in Zululand, 930 are in the city of Durban, 175 in Pietermaritzburg, 50 in the country districts of Natal, and the remainder in the smaller cities and towns. In 1911 there were only 100 cars in Durban and only 37 in Pietermaritzburg. This will give an idea of the rate at which demand has increased in the past eight years. There are 19 automobile agencies in Natal, 12 of which are in Durban and 3 in Pietermaritzburg. All these agencies carry cars in stock, as well as parts and accessories.

The market for motor vehicles in the Province of the Cape of Good Hope is limited to the white population of 617,131 persons. In 1918 there were 8,550 automobiles and 4,119 motorcycles registered in the province. America's share in the prewar trade was unfavorably affected by the fact that no direct steamship connections existed, and all such freight was shipped via England. Now, however, the bulk of the merchandise imported from the United States comes direct. The temporary withdrawal of the British producers from this market during the war also exerted a great influence in favor of the sale of American machines. But, even if this favoring circumstance had not existed, American cars would undoubtedly have predominated here in time, as they are more eminently fitted to cope with South African difficulties than are the British makes.

From 1910 to 1916 the mileage of good roads in the Cape Province more than doubled, under an active program of construction. This program was halted by war difficulties. At the close of 1916 the total mileage of roads in the province was 20,187, nearly all of which is still suitable for motor travel. But there is much room for further improvement in highways.

There are approximately 3,100 motor cars and 20 motor trucks in Johannesburg alone. Many different makes are represented in this number; the principal sources of supply are the United States, United Kingdom, Canada, France and Italy, and formerly Germany.

Packard's new design of glass-carrying truck.

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Legislation and Legal Decisions

Comments on Current Legislation Affecting Sale and Operation of Machines Together with Answers to Questions Will Be Found in This Department Each Month

By A. KALISKY
Attorney-at-Law, New York City.

EVERY person who owns, drives or is driven in an automobile, as well as those who operate fleets of motor trucks and horse-drawn vehicles, and corporations operating street car lines and motor 'buses in the city and throughout the state of New York are affected by a measure now before the legislature. This is an act to amend the penal law in relation to the negligent operation of motor vehicles.

The amendment would make a person "who operates or drives or knowingly permits any one subject to his commands to operate or drive, any vehicle of any kind in a culpably negligent manner whereby another suffers bodily injury, is guilty of assault in the third degree," the maximum penalty for which is one year in prison, $500 fine or both.

The bill was introduced in the assembly last month by George R. Fearon, chairman of the committee on cities, at the request of Magistrate W. Bruce Cobb, of New York City, who has given much careful study to traffic conditions. He hears many cases of infraction of the laws in the Traffic Court with Magistrate Frederick B. House. Another sponsor of the measure was Judge B. J. Shove, of the Court of Special Sessions, Syracuse.

According to Assemblyman Fearon the bill has been approved by a large number of judges from various city courts and magistrates' courts and has the approval of the secretary of state. A date for a hearing has not yet been set, but it will doubtless come up for argument the last of this month or in the early part of March.

IN the opinion of the attorneys for the Automobile Dealers' Association, which will vigorously oppose the bill, "it makes the owner of an automobile criminally liable if any one in his employ operates a machine in a culpably negligent manner, provided some other person suffers bodily injury therefrom. In other words, the owner of a motor vehicle would be individually responsible criminally if it were proved that one of his employes had driven or operated a car in such fashion as could be determined as culpably negligent.

"The happening of the accident of itself constitutes the criminal act for which the owner, who may not be at all responsible, or who may be absolutely innocent, may be apprehended by the authorities.

"It also applies to the owner of any automobile who permits another to operate it, provided, of course, that there is an accident by which some one suffers bodily injury and culpable negligence is shown.

"The proposed legislation if enacted into law would create many situations where innocent persons would, without their knowledge, be committing assaults in the third degree."

In support of his measure, Magistrate Cobb said, in part:

"There has long existed in the law of this state an omission which viewed in the light of present day traffic problems, demands earnest attention. It is this: 'If one, by reason of gross or criminal negligence in driving or operating a vehicle of whatever sort, kills a person, he is guilty of manslaughter.'

"If he fails to kill him, he is guilty of no offense of any great consequence even though the victim be horribly mangled or hopelessly crippled. The only exception is where the act complained of is so widely wanton as to be equivalent to that intent which the law requires in nearly all serious crimes.

"GRANTING that police authorities too frequently bring a 'technical charge of felonious assault' merely because some one was hurt and irrespective of the real blame, the fact remains that the trifling number of cases even held for trial, much less indicted or convicted, indicates there is something radically wrong.

"It by no means follows that all the drivers and operators discharged were so far free from culpable negligence as to be properly immune from punishment. Doubtless some deserved decidedly severe punishment and many more punishment of some sort.

"To be sure the charge of 'reckless driving,' so-called, may be invoked, but a glance will show that the penalty therefor is in every way inadequate, especially in a flagrant case. Under the motor vehicle law as it now reads it is a $100 money fine. Under the New York City ordinances it is $100 or fifteen days in prison, or both.

"When we remember that if the victim happens to die the accused becomes guilty of manslaughter, it seems as if some middle ground for prosecution should be created if the victim happens to live.

"In creating such middle ground it is not necessary to fly to extremes even to characterize the offence as a felony. While the more flagrant cases may seem to merit such treatment, it believed that the greater number may not, and that better results in prosecutions and convictions will be attained if without extreme measures. To be too severe may well cause the law to overreach itself, so that grand juries will be loath to indict and petty juries to convict.

"It is, therefore, believed that a person guilty of culpable negligence in driving or operating a vehicle whereby another is injured, should be a misdemeanor and be included in what is known as assault in the third degree.

"The amendment relates only to injuries from vehicles and not from other causes, since it is from the toll of deaths and injuries due to too frequent disregard of prudence in traffic cases that the need springs.

"It will be noted that vehicles of every kind are included, which would comprise horse-drawn vehicles and street cars as well as automobiles. Not only is the driver or operator made liable, but any person who actively or tacitly directs or permits the negligent operation.

"THE average person using a fair degree of skill and observing the ordinary rules of the road, would have nothing to fear from this amendment should he chance to have an accident and injure some person on the highway. It is only the grossly careless who need dread this legislation."

In order to secure some idea how the proposed amendment might impress the judiciary, it was presented to several county judges of New York City for an opinion, Judge Rosalsky, of the Court of General Session; Judge McDermott, of Kings county, and Judge Gibbs, of Bronx county, have indorsed it, according to Magistrate Cobb.

It is understood that the measure was brought to the attention of the committee on the amendment of the law of the City Bar Association, and that the committee expressed its disapproval and has so notified the legislature.

Truck Specifications

More than two hundred facts of general and special interest concerning each of hundreds of American- and Canadian-made motor trucks are given in an extensive section devoted to engineering and selling data in the 1920 edition of the POWER WAGON REFERENCE BOOK. The machines described are arranged for convenience according to their carrying capacities, so that vehicles of like load-rating can be readily compared. By a simple system of cross-reference the reader is led from frequently sought information to that required only in answer to unusual questions.

Power Farming

For the heavy work of a farm the value of the tractor is no longer in dispute. Even

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men who for various reasons do not use it concede its effectiveness. The tractor is a superplowman. It enables the farmer to break his ground deeper than he could with horses and to plow in the heat of the summer—this last a very important factor in the raising of wheat. In emergency, if there is enough human help to be had, he can keep the plows going twenty-four hours in the day. At harvesting, too, the mechanical draft horse is a crop saver of the finest sort.

With feed at the prices named a horse must be a good worker to earn his keep. The engine, which eats only when it is working is clearly the cheapest help. It is to be hoped manufacturers will not take advantage of this condition to relax their efforts at perfecting their machinery. At least half the horses and mules of America should be replaced by mechanical power, but the change will be delayed and fall short of producing its full measure of benefit unless the replacing machines are brought to the highest pitch of usefulness.

Truck Use in Leading Trades

A section of more than 100 pages in the 1920 edition of the POWER WAGON REFERENCE BOOK is devoted to studies of the use of motor trucks in various leading industries. The methods employed by well-known operators are treated and are accompanied by the signed statements of owners telling of their experiences with motor haulage. All but a few of the studies include elaborate tabular data, showing the number of motor trucks in use, their value and distribution, and the number of owners. An additional feature of value will be found in the figures showing the number of concerns engaged in each industry treated. Other tables show the yearly gowth in the use of machines, and the number and percentages of each size employed in 1919.

Turner Joins F. W. D.

W. C. Turner, prominent figure in automobile circles in the west, has been appointed district sales supervisor of the Four Wheel Drive Auto Company, Clintonville, Wisconsin, makers of FWD motor trucks. Mr. Turner will be located at Omaha and will cover Nebraska and Iowa. During the war Mr. Turner was in the Motor Transport Corps of the Army and in charge of a motor supply train base at Waco, Texas. He comes from the Packard Company, Chicago.

Selden Sends Salmons Seaward

Robert H. Salmons, vice-president of the Selden Truck Corporation, of Rochester, New York, in charge of foreign business, sailed on February 14 for an extended trip to the West Indies, including Cuba, Haiti, Santo Domingo, Porto Rica and Jamaica. Selden motor trucks are represented in some of these countries and it is Mr. Salmons' intention to spread the "Selden Gospel" in those countries where Selden is not known. The trip outlined will cover a period of several months.

Coming Market for Farm Tractors in Sao Paulo

BRAZILIAN FARMERS AWAKENING TO NEEDS

Up to the beginning of 1919 there appeared to be no demand for farm tractors in the State of Sao Paulo, Brazil. The principal crop of this state required little cultivation, the keeping down of other vegetable growth being accomplished with hoes and light machinery. Furthermore, the coffee was almost always planted on new land amid stumps and fallen logs, and the more hilly and broken the country, the better the air drainage and the less the danger from frost. Consequently, the field for tractors was exceedingly limited.

But the great growth of the Brazilian textile industry during the war and the resulting stimulus to cotton production; the heavy frost of 1918, which did extensive damage to the coffee plantations; the constant struggle of the planters against such discouraging circumstances as labor shortage, low prices of coffee, and unfavorable exchange rates whereby the planter receives fewer milreis for his crop even when prices to the consumer are going up—all these conditions are forcing the planters to take up other lines of agriculture to a greater extent than heretofore.

The state government maintains an agricultural college, called the Escola Agricola Luiz de Queiroz, near Piraccicaba. The director of the model farm of this school, who has recently returned from the United States, where he went to study improved methods of farming, has just published a pamphlet describing the farm tractor, the purpose of which pamphlet is to stimulate the interest of the Paulista (Sao Paulo) farmers and planters in this type of machinery. The author does not pretend to present new facts developed by himself or the school in the use of tractors; but rather he sets forth results which have been obtained elsewhere and arguments which have been developed elsewhere, showing the efficiency of the tractor. The pamphlet gives illustrations of tractors of different types in use on the model farm at Piracicaba, as well as in the United States.

American manufacturers should not conclude from the foregoing that there will be a large demand for tractors in the immediate future; but from the evidences of an awakening interest in this type of machinery, it appears likely that the demand therefor will grow in the near future to a point where it will furnish an amount of business worth the attention of exporters.

There is, as yet, no preference for any particular type of tractor, as all of them seem to be regarded with equally friendly interest, or perhaps curiosity. Recently a caterpillar type of tractor manufactured in the United States was seen in a demonstration, and all the farmers who witnessed its performance expressed their belief that such machines would soon be as common on the plantations as automobiles are in the city; that is, every one who could afford one would have it.

The matter of obtaining satisfactory agents for tractors will present some difficulties, as the dealers in agricultural machinery are not yet convinced that a demand exists and are consequently unwilling to tie their money up in something they are afraid they can not sell. However, the indications for a future demand are favorable, and our manufacturers should keep this field in mind.

Horses Down—Trucks Going

The terrible condition of the streets and roads during the recent blizzard has demonstrated more vividly than ever the need of adequate motor service for the man who must have transportation in winter. While horses were completely stalled in the huge drifts which covered the streets of New York and other eastern cities, the motor truck moved serenely on its way, doing business as usual.

It takes some such object lesson to thoroughly teach the value of motor trucks. These efficient adjuncts of civilization have saved the country millions of dollars during this severe winter and have turned the minds of men to them as a solution to long-vexing problems.

S. E. Bennett, district representative of the Rainier, was in Boston during the height of the storm and says the conditions in that city were identical with those in New York—horses all down and motor trucks plowing gloriously ahead!

Callahan With Martin-Parry

The election of John A. Callahan, formerly general factory manager of the Curtiss Aeroplane & Motor Corporation, of Buffalo, New York, to the Board of Directors of the Martin-Parry Corporation, was announced recently by F. M. Small, president of the last-named concern. Mr. Callahan becomes vice president and director of production of the Martin-Parry Corporation, which is considered to be the largest commercial body building concern in the world, with large plants at Indianapolis and York, Pennsylvania.

Hersey Joins Vulcan

Dwight T. Hersey has taken up his new duties as director of sales of the Jenkins Vulcan Spring Company, Richmond, Indiana. Mr. Hersey was for many years associated with the Splitdorf Electrical Company, both in the capacity of branch territory representative and more recently in the factory sales department at Newark, New Jersey, and he brings to his new duties a rare experience of executive sales and general trade distribution.

Tractor Specifications

Detailed data concerning several hundred farm tractor models of current design are included in a large section devoted to power farming in the 1920 edition of the POWER WAGON REFERENCE BOOK. Supplementing these data are blue-prints showing side elevation and plan views of leading tractors, and an authoritative article on power farming by Professor Earl A. White, treating the design, application and use of farm tractors.

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COMING EVENTS.

March—Adelaide, Australia—Exhibition of Motor Vehicles and Automotive Equipment.
March 1-3—Portland, Me. Annual Car Show, auspices Portland Auto Dealers' Assn., Exposition Building; Howard B. Chandler, manager.
March 1-6—Tulsa, Okla. Annual Car Show; Henry B. Marks, manager.
March 1-6—Richmond, Va. Annual Car Show, auspices Richmond Auto Trade Assn., Gray's Armory; J. D. Kline, manager.
March 1-6—St. Joseph, Mo. Car, Truck and Tractor Show, auspices St. Joseph Automobile Dealers' Show Assn., Auditorium; John Albus, general manager.
March 1-6—Perth Amboy, N. J. Car Show, auspices Perth Amboy Auto Dealers' Assn.
March 1-6—Buffalo, N. Y. Eighteenth Annual Car Show, auspices Buffalo Automobile Dealers' Assn.
March 1-6—Scranton, Pa. Car, Truck and Tractor Show, auspices Scranton Motor Trades Assn., Armory; Hugh B. Andrews, manager.
March 1-6—Omaha, Neb.—Car Show, auspices Omaha Automobile Trade Association, Auditorium; Clark G. Powell, manager.
March 1-7—Springfield, Mass. Car Show, auspices Springfield Automobile Dealers' Assn.
March 1-7—Grand Rapids, Mich. Car and Truck Show, auspices Automobile Business Assn.
March 1-8—Seattle, Wash. Annual Car Show, Motor Car Dealers' Assn.; Armory; W. J. Coyle, manager.
March 1-15—Lyons, France. International Fair.
March 2-6—Denver, Colo. Car and Truck Show, auspices Automobile Trades Assn. of Colorado, Denver Union Stock Yards Arena.
March 3-6—Lancaster, Pa. Car Show, auspices Automobile Trade Assn.
March 3-6—Clinton, Ia. Annual Car Show, auspices Clinton County Automobile Dealers' Assn., Coliseum; Harry G. Finch, manager.
March 6-13—Santa Rosa, Cal. Annual Car Show, Sonoma County Auto Trade Assn.; L. L. Putnam, manager.
March 7-13—Muskegon, Mich. Car and Truck Show, Armory.
March 8-13—Syracuse, N. Y. Car Show.
March 8-13—Indianapolis, Ind. Twentieth Annual Car Show, auspices Indianapolis Auto Trade Assn.; John B. Orman, manager.
March 8-13—Paterson, N. J. Fourth Annual Show, Paterson Automobile Trade Assn., Armory; H. A. McGinley, manager.
March 8-13—Gloversville, N. Y. Gloversville-Johnstown Car Show, State Armory; Benefit Co. G; James J. Callahan, manager.
March 10-13—Lebanon, Pa. Annual Car Show, Automotive Trade Assn. of Lebanon; J. Paul Erick, manager.
March 10-15—Great Falls, Mont. Car Show.
March 11-13—Pendleton, Ore. Annual Car Show, auspices Pendleton Automobile Assn., Happy Canyon Pavilion.
March 13-20—Boston, Mass. Car Show; Chester Campbell, manager.
March 13-20—Asbury Park, N. J. Car Show, Asbury Park Casino.
March 13-20—Asbury Park, N. J. Truck and Tractor Show, Arcade Building.
March 15-20—Great Falls, Mont. Fifth Annual Car Show, auspices Montana Auto Distributors' Assn.; A. J. Brendenstein, manager.
March 15-27—Wilkes-Barre, Pa. Annual Exhibit of Cars and Trucks.
March 17-18—Lake Charles, La. Convention, Louisiana-Mississippi Automotive Trade Assn.
March 20-27—Pittsburgh, Pa. Annual Car Show, Automotive Assn., Inc., Motor Square Garden; John J. Bell, manager.
March 22-27—Trenton, N. J. Car and Truck Show, Trenton Auto Trade Assn., Armory.
March 22-27—Wilkes-Barre, Pa. Truck Show, Automobile Dealers' Assn., Armory.
March 22-27—Torrington, Conn. Car Show, State Armory; James J. Callahan, manager.
March 25-27—Fort Worth, Tex. Fourth Annual Convention, Texas Automobile Dealers' Assn.
March 31-April 3—Goldsboro, N. C.—Car and Truck Show, auspices Goldsboro Automotive Trade Assn.
March and April, 1920—Pretoria, South Africa. South Africa Products Exposition. (Overseas motor vehicles especially features.)
April 3-May 4—Buenos Aires, Argentina. Exhibition of U. S. Manufacturers.
April 12-17—Hot Springs, Ark. Eighth Annual Convention, U. S. Good Roads Assn.
April 12-17, Hot Springs, Ark. Eighth Annual Good Roads Show, auspices U. S. Good Roads Assn.
May 15-20—San Francisco, Cal. Seventh Annual Foreign Trade Convention.
April, 1920—London, England. Olympia Commercial Vehicle Exhibition.

Pierce Arrow Engines Given Tests That Insure Best Working Results

The Pierce-Arrow Motor Car Company, of Buffalo, has just completed the installation of a motor-testing apparatus. Every engine, whether motor truck or passenger car, produced by the company is subjected to the rigid test routine made possible by improved electric dynamometer apparatus.

Under the improved method of testing an engine passes through three stages. It first is driven electrically until the moving parts are worn in, whereupon the engine is run for a number of hours under its own power at various speeds. Throughout this entire period instruments reveal accurately the internal friction of the engine, its speed and the horse-power developed by it. The engine then is disassembled and the parts inspected by experts, who rebuild it after making adjustments or corrections.

In the final stage, the engine is coupled with a dynanometer in a silent room. At this stage of the test is recorded complete data as to power, gasolene consumption, internal friction and other vital facts. Here, too, the tester adjusts ignition, carburetion, valve action, etc., so that when the final O. K. is given, a perfect engine is ready for the chassis.

Guard Protects Speed Truck

On the occasion of striking some obstruction or of a collision with another vehicle, the front bumper of the Graham Brothers' speed truck may become distorted or bent, while saving the machine itself from injury. To provide for just such an occasion the bumper has been bolted to the frame. So it is only a matter of removing four bolts and having the bumpers straightened at the nearest blacksmith shop. If the bumper were riveted in place, the motor truck owner would probably neglect having it straightened. This bumper also acts as an additional front cross-member, protecting the frame and power plant against possible distortion through striking an obstruction at an angle or similar shocks. The bumper bolts take practically all torsional strains off the front engine cross-members.

Motor truck frames with drop cross-members are often used as engine supports, but without a similar bumper cross-member construction, where the rivets through the flanges have worked loose in a short time, due entirely to the bending action of the springs, twisting the frame and thus highly stressing the rivets.

Thorne with Diamond T

D. J. Thorne, formerly assistant sales manager of the Acme Steel Goods Company and later western manager of the Gerard Wire Tying Machines Company, has become a member of the Diamond T Motor Car Company's sales organization. He will be manager of the district comprising the lower peninsula of Michigan with the exception of Cass and Berrien counties; in Ohio he will have jurisdiction over Lucas, Ottawa, Sandusky, Seneca, Crawford, Morrow, Delaware, Licking, Muskingum, Morgan, Athens, Meigs, Gallia and Lawrence counties. In Kentucky his district includes Henderson, Davies, Hancock and Union counties. He will have the supervision of Indiana with the exception of the following counties: Lake, Porter, La Porte, St. Joseph, Washington, Scott, Harrison, Floyd, Clark, Elkhart, Dearborn, Switzerland and Ohio. During the war Mr. Thorne was with the Motor Transport Corps.

Supply Trucks Solve Problem of Ice Deliveries to Horse-drawn Wagons

Just how to solve the one big problem of the city iceman, how to deliver to customers at outlying points in the city, miles from the big ice factory itself, has long been a problem to American refrigerating interests until now a great motor truck, adapted to this purpose, has come in. In Cincinnati, where the experiment has been made and is pronounced most unqualifiedly a success, one great ice company uses six such motor trucks, each of 5-tons capacity. Other, more usual ice wagons leave the factory fully laden on schedule and travel their several routes as before, delivering from house to house.

The truck drivers, however, know approximately when and about where such wagon will be empty, and then, instead of it making the long trip back to the factory, or to some ice depot, it has the ice truck meet it. Three wagons can be filled from the supply truck each trip from the factory, and while these three are delivering, the motor truck returns to the ice plant for another supply. The problem of transferring ice from motor truck to wagon is easy: Truck end and wagon end are backed together, skilled men with tongs take hold and shove the blocks as desired, the chauffeur lends hand, and in a very few minutes the work of exchanging load is done. After these morning deliveries to wagons—perhaps three or four to each—the big motor trucks are employed in hauling wholesale ice supplies to butchering establishments and others buying in quantities, in the afternoon trade.

Era of Good Roads Near

"The farmer to-day is facing the problem of increased production and is logically turning for its solution to the same methods that manufacturing industies have found efficient," says Charles B. Voorhis, Vice-President and general sales manager of The Nash Motors Company. "Time saving machinery rapidly is taking its place on the farm and the importance of this is evident in figures which show that during the past year thousands of motor trucks were installed by farmers. This was made possible, of course, through improved highway conditions."

This year's corn crop is said to amount to 2,900,000,000 bushels of 12,500,000 government tons. If this crop were moved to market an average distance of 5 miles by team and wagon it would cast $108,750,000, as compared with a cost of $54,375,000 if hauled by motor truck, based on averages supplied by the United States Department of Agriculture.

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Wood Motor Truck Wheels

By S. VANCE LOVENSTEIN
President, Schwarz Wheel Company

A PAPER entitled "Steel Truck Wheels" was read at the semi-annual meeting of the S. A. E. held at Ottawa Beach, Michigan, in June, 1919. This paper was afterwards printed in the August issue of the "Journal of the Society of Automotive Engineers." Its author deserves commendation for the masterly manner in which he handled this subject, but it is quite obvious that he has overlooked a number of important points in connection therewith.

He has given no credit to wood wheels for the wonderful service they are rendering daily to the transportation world and the enviable reputation they have established is belittled when the author says:

> While recognizing that in the past the majority of motor trucks have been equipped with wooden wheels which, as a whole gave good service, we believe the time is fast approaching when the result demanded in service will make imperative the substitution of steel wheels on medium and heavy duty trucks, thus eliminating practically the last important truck unit made of wood.

Mr. Steel-Truck-Wheel Man seems to be laboring under the impression that all the initiative and engineering ability required to reach some future contingency is wrapped up in his own product. He seems to have overlooked the significance of his observation that in the past wood wheels, "as a whole gave good service." He does not give wood wheels the credit for giving good service to-day—but that is possibly an author's pardonable oversight. Wood wheels are delivering satisfactory service—over 5,000,000 owners will vouch for that. Should the contingency arise at some future date requiring additional strength or some other requisite—there will be a good wheel to meet the demand.

We might say here that the whole aim of the steel wheel industry at the present time seems to be to produce a wheel that will give as good service as wood wheels have rendered for many, many years. And this does not mean a wheel that will merely survive a laboratory test, but one that will give years of actual service filled with hundreds of thousands of economic miles. Please bear in mind that the danger of disintegration due to molecular vibration is not by any means confined to wheels alone. There are some very important parts of the modern self-propelled vehicle which are unprotected by spring suspension—axle, axle-housing, differential gears, propeller shaft, universal, wheel bearings and the component parts of these units. Excessive vibration transmitted to these parts will soon play havoc with any or all of them.

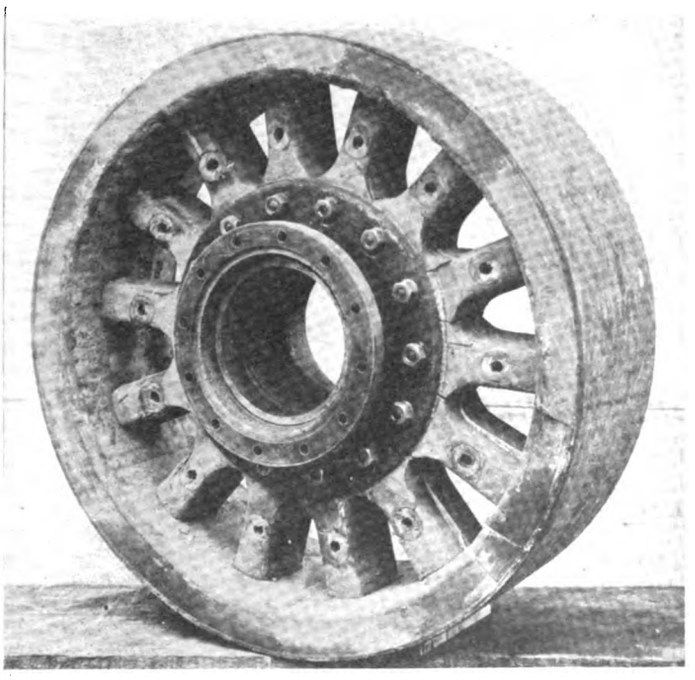
In an endeavor to produce a steel wheel to take the place of wood wheels, the effects of vibration on metal wheels could not be very well overlooked. The effects of this vibration transmitted undiminished to the unsprung parts of the motor truck seems to have been sadly neglected as far as a preventive is concerned. Careful investigation shows no laboratory breakdown test registering the metal fatigue in steel wheels caused by vibration. And for the simple reason that wood wheels are not affected by vibration, no test was necessary for them.

Why mention these unsprung parts? One can not help but wonder what was happening to them during the intervals mentioned in the following paragraphs. Under the heading, "What is required in design," some interesting data on the result of vibration to the wheels themselves are given. It is first hand information, for the author is chief engineer of one of the steel wheel factories. He says:

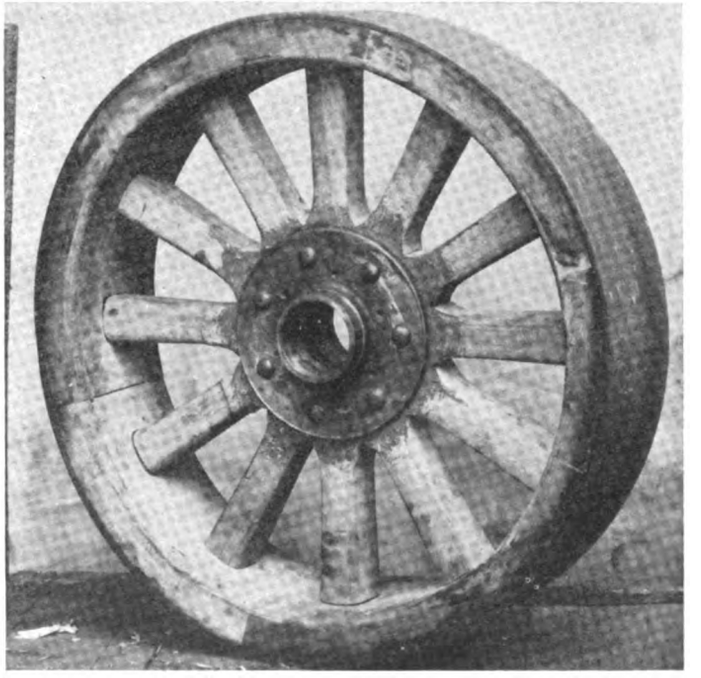
> The design (for steel wheels) must be such that vibrations resulting from road shocks are not concentrated at any one point, but distributed over or dissipated throughout, the entire wheel structure; otherwise metal fatigue eventually results. The materials having a low, elastic limit are not suitable for motor truck wheels any more than malleable or wrought iron is for vehicle springs, as a successful wheel must have a certain degree of resiliency. Many of you have no doubt had experience with the early designs of built-up metal wheels and are well acquainted with the difficulties of loosened rivets and bolts, also with cracks developing in some types of cast disk and spoke wheels.

Right here is the crux of the whole situation. Vibration loosened those bolts and rivets and developed those cracks. Why attempt to combat vibration with that material which is most susceptible to its damaging effects, namely—steel or any alloy with iron as its base? Its weaknesses are again emphasized when he says further:

> All steel or iron castings are composed of crystals which are formed as the metal cools and run as consistently as fibres in wood. Just as the weak spots in wood are found where the branches run out, so the weak spots in castings are found where the right angle joints occur.
>
> A hollow spoke, hollow rim construction with a semi-flaring attach-



Wood wheel after tests by Bureau of Standards.



2½-ton S. A. E. wheel after 100,000 pounds pressure.

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ment to the rim is a partial recognition of this fundamental principle, but a full realization of it is attained only by the hollow spoke wheel where the spokes join a rim in broad, sweeping curves, giving arch-like support to the rim.

This advocate of steel wheels with broad flaring spokes, says the construction of his wheel eliminates metal fatigue due to vibration. Fine—it is a wonderful engineering achievement—but, what becomes of the vibration? Surely it is not absorbed in the wheel itself, which is made entirely of steel. It must, therefore, be transmitted to the wheel bearings and from there to other unsprung parts of the vehicle. Wood has wonderful resiliency; therefore, maximum vibration-absorbing qualities. The ingenuity used in wood wheel spoke construction is devoted, not to protecting itself but to absorbing all vibration within the wheel so that it will not be transmitted. This, in contrast to the cast steel wheel which must be so constructed that vibration will not prove fatal to itself. Please bear this contrast in mind when reading the continuation of the paragraph just quoted:

At the same time avoiding crystalline formation and placing the metal so that the high elastic quality of steel is utilized somewhat in the form of a spring instead of as a dead strut.

Vibration never affects wood wheels for the reason that the resiliency of wood absorbs it. And being absorbed in the wheel itself vibration is not transmitted undiminished to other motor truck parts.

UNDER the paragraph, "Strength of wood and metal wheels compared," a chart is shown and herewith reproduced.

In the paragraph he says: "It should be noted that the wood wheels were not loaded above 60,000 pounds, as the speed of deformation indicated an approach to the yield point." This statement is not entirely accurate. It so happened that when this test was made by the Bureau of Standards, Washington, D. C., the Quartermasters' Department of the United States Army did not have a wood wheel for the test and one was taken from a motor truck that had traveled many thousands of miles. This is verified by the Official Report of the Director of the Bureau which says: "This wheel had been used on a motor truck for some time and there were no identifying marks on it. It is thought, however, to have been a Schwarz Wheel." This one wheel had to be used for both tests—radial and side thrust.

The official figures show that with a radial load of 60,000 pounds a deformation of 0.1062 inches was registered. That was not a permanent deformation but at the time pressure was exerted. It was the resiliency in wood that permitted this deformation and it is the same resiliency that returned the wheel to almost its original set as soon as pressure was released—0.0336 inches. Had this test been made under working conditions the motion of the wheel coming in contact with the road over its entire circumference would soon have worked out all deformation—due to wood wheel spoke construction.

It was not due to "the speed of deformation indicted and approached to the yield point" that no more pressure was applied but to the fact that this same wheel had to be afterwards submitted to a side thrust test. The officers conducting the test feared that the wheel might be damaged by additional pressure and be useless for the latter test, and a letter from the Bureau of Standards says, "The wheel was not loaded to destruction in the radial compression test as it was necessary to use the same wheel for the side thrust or skid test."

HEREWITH is reproduced a photograph of the wood wheel after being submitted to both tests. Mud, grease and lack of paint plainly show its length of service before being used in these demonstrations. In addition to the tests noted above, in October of this year additional tests were made at the Civil Engineering Laboratory of the University of Pennsylvania on Schwarz wooden motor truck wheels.

A 2½-ton rear wheel 36x4 inches dual, with twelve 2½-inch spokes with SAE band applied, was subject to a radial compression test of exactly 100,000 pounds. The wheel was tested in compression by supporting it on a cast iron block and stressing it radially by applying load through a spindle passed through the hub of the wheel. The area of the block in contact with the circumference of the wheel was equal to a 6-inch arc on the full 8-inch face of the wheel. Load was applied in increments of 10,000 pounds. At 70,000 pounds a slight cracking was heard, but no distress was visible. At 100,000 pounds pressure, two spokes started to bend and the sum total of the damage was that two spokes on each side of the load were drawn 3/16 inch away from the wood felloe, and resumed their former position within 1/32 inch after this load was released. The total deflection of the wheel under 100,000 pounds was 25/32 inch.

From the photograph shown here (Figure 3) it will be noted that the wheel shows no pronounced damage. In fact, it is safe to say that it could be used in service for many thousands of miles. This is still another proof showing the strength, resiliency and efficiency of wood wheels.

STRENGTH TESTS OF METAL WHEELS.

36 by 5 Front Wheels.*

Type.	Weight, lbs.	Maximum radial load applied, lbs.	Deformation at maximum load, ins.	Permanent set at maximum load, ins.	Ultimate side thrust loading, lbs.
Pressed steel, built up	147	40,000	.....	.....	30,500
Malleable iron	147	60,000	0.0677	0.0259	27,600
Cast steel disk	169	60,000	0.0359	0.0187	48,100
Cast steel, hollow rim, hollow flaring spoke	100	60,000	0.0645	0.0220	49,200
Wood		Front wheels not tested.			
36 by 10 Rear Wheels.					
Pressed steel, built up	341	75,000	0.4153	0.3425	43,200
Malleable iron	266	100,000	0.1928	0.1180	42,500
Cast steel disk	268	100,000	0.0881	0.0261	75,500
Cast steel, hollow rim, hollow flaring spoke	286	100,000	0.0515	0.0113	101,000
Wood	252	60,000	0.1062	0.0336	43,700

Under the paragraph, "Metal wheels in service," the author says, "Probably the companies having the best opportunity to follow up wheels in service are the London General Omnibus Company or the Fifth Avenue Coal Company, both of which use metal wheels exclusively." The latter part of that statement is not correct for both companies use some wood wheels. It is admitted that these companies have the best opportunity "to follow up wheels in service." Yes, a wonderful opportunity and it so happens that one of these companies has recently written to one manufacturer of wood wheels saying they intend to replace all metal wheels with wood. And the intention has already been put into action for some have been replaced.

Wood wheels are delivering satisfactory service—over 5,000,000 owners will vouch for that. Should the contingency arise at some future date requiring additional strength or some other feature, there will be a wood wheel to meet that demand, just as there always has been one in the past.

A LARGE amount of publicity has been given to the unproved assertion that the world is rapidly approaching a wood famine. There is a wood shortage today—a shortage of cut wood. Note that distinction—cut wood. And it is due to labor shortage only. Refer to the reports of the United States Government Forestry Bureau where figures show that in 1913 there were cut 38,387,009,000 feet of lumber and in 1918 only 29,262,020,000 feet. A big difference but due to labor shortage only. In the meantime, Dame Nature chuckles to herself over the alarm, predicated on that assumption of a wood shortage, and her mighty irresistible force continues to produce more wood.

The automotive industry need lose no sleep over it—there is enough wood suitable for wood wheels to last for many generations and even beyond that time when wheels will no longer be used for locomotion. Wood wheels have been used for years and will continue to be used on the world's best cars.

Electric Truck Haulage

A very complete and enlightening article on the application, use and economy of electric trucks, written by one of the foremost authorities on the subject, forms part of an extensive section devoted to the electric truck in the 1920 edition of the POWER WAGON REFERENCE BOOK. Complete specifications of electric trucks for outdoor and indoor service are also included, together with blue-prints showing side elevation and plan views of well-known machines.

Tri-City Dates Changed

Due to conflict of dates, the annual show of the Tri-City Automobile Trades Association will be held March 8 to 13 at Rock Island, Illinois, instead of one week earlier as first arranged. It was found that the annual show of the Clinton, Iowa, dealers will be held on the first week of March. The Tri-City show promises to be a great success. Sixty exhibitors have spoken for space and every available inch will be taken.

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The only reason why Smith Wheels are hubless is, we know that the hub cast integral wheel for motor trucks is not the right type of wheel for the purpose. We have learned this from our vast experience and observation in designing and building all kinds of metal wheels for various uses.

Smith Wheels at all times give satisfactory, dependable service. That is why they are guaranteed forever.

Smith Wheels are supplied to the truck maker when wanted. The making of trucks is not held up for lack of them. Our deliveries of Smith Wheels eliminate excuses and their service results and appearance also help to make their big sale.

Our desire is always to convince by facts. There is a world to be learned about metal wheels.

SMITH WHEEL INC.
SYRACUSE, N.Y., U.S.A.

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Correspondence

General Correspondence, Criticisms, Suggestions, and Discussions Concerning Any Subject of Interest to Those Who Design, Manufacture, Sell or Use Commercial Motor Vehicles, Their Parts or Accessory Equipment, Are Solicited

Objects to Smith Ad

To the Editor.—Permit us to call your personal attention to the advertisement on the Smith wheels on page 85 in the February issue of POWER WAGON.

We feel confident that it could not have been shown to you in copy, as it certainly will occur to you that such methods on the part of a manufacturer on any type of product are scurrilous in the extreme and should not be countenanced by journals of such high repute as POWER WAGON. We can only infer that it must have slipped through without notice of those in charge of copy.

The alleged facts as stated in the advertisement are not true and the main purpose of the advertisement in its make-up seems to indicate a desire for mud slinging of the most despicable character. It is beneath the dignity of a reputable manufacturer to reply to this kind of stuff and we make no attempt to do so, believing that it will sink of its own weight.

Such persons as may have doubt on the subject would inform themselves before being misled, but as an authority on automobile subjects, such as POWER WAGON has become, particularly because of the wide range of the text-book that you publish, the writer feels that your attention should have been called to an advertisement of this character so that it should not be printed except with your knowledge and consent.

WEST STEEL CASTING CO.,
Geo. L. Lavery, *Mgr.*,
Steel Wheel Department.

Cleveland, O.

Metal Wheel Advertising

To the Editor.—Our attention has been drawn to the Smith Wheel advertisement on page 85 of your February number.

Our client, the Clark Equipment Company, objected to some of the Smith copy appearing some time ago, which according to our opinion was not the right type of copy for a publisher to accept for publication. We believe that the February Smith page is also one that is not along the proper lines.

There are many motor truck manufacturers using a steel wheel with the hub cast integrally and from all reports these manufacturers are well satisfied with this type of metal wheel. Therefore, we believe that the Smith copy would make such truck manufacturers feel unkindly toward the Smith company, as well as other wheel makers.

We draw this to your attention for the good of the cause.

THE MCKINNEY COMPANY.

Chicago.

Standardized Truck Bodies

To the Editor.—The writer was very much interested in an editorial which appeared in the November issue of your publication with reference to standardization as applied to truck bodies. It seems to him that the principal difficulty in the whole standard body business is that of distribution. With the exception of dump bodies and two or three types used on lighter trucks up to 2-ton capacity we are inclined to think that the burden of supplying bodies should not be placed on the truck manufacturer. There is a distinct field existing at the present time for a body jobber or distributer, who carries in stock a large assortment of styles and sizes ordinarily used by truck buyers, and who is in a position to give immediate deliveries on such bodies to the dealers and truck buyers in the territory covered by him. On account of the extreme weight and size of truck bodies we have found that a body distributer is limited to a territory within a driving radius of his point of distribution. In other words, a dealer could profitably drive a truck up to a distance of 50 or 60 miles, if he could get immediate delivery on a standard body by doing so. No one body manufacturer can cover the whole standardized field. Standard bodies have to be built in large quantities in order to compete with the small local shops, and each body manufacturer wishes to keep the number of different styles he is making down to a minimum. A body distributer or jobber can offer a very complete assortment by combining the lines of two or three or more body manufacturers, each of which is specializing on certain types of bodies. It is our experience also that most of the truck dealers do not wish to buy and carry any stock of bodies, nor does the average dealer have room to store and handle these bodies, even if he wished to do so. They all want to get quick delivery of standard bodies so that when they sell a truck they can get the body mounted immediately and sell the complete outfit rather than let the customer take care of the body end himself.

METROPOLITAN BODY CO. OF NEW YORK,
Paul Murray, *Manager.*

New York, N. Y.

Horses vs. Motors

To the Editor.—Our firm is selling tractors; we expect soon to be selling trucks. We do not for a moment question the logical place there is for these devices, both in city and country. We are very far, however, from being stampeded into any notion that the horse is a dead issue, not for any considerations of sentiment, but strictly on the grounds of hard business and scientific facts. It is, of course, true that the stupendous enterprise and energy that have been put into pushing the sales of tractors and trucks have completely overshadowed anything that was ever done in the horse industry, and for perfectly logical reasons that have nothing to do with the relative merits of horses and automotive power units. But in the last analysis the relative positions in industry of horses and automotive units will be determined not by advertising but by the "dollars and cents" experience of users. There are many, many kinds of work for which the horse is most efficient, and will continue so for many years to come. And this is not confined to field work on the farms. Although, as previously stated, we expect before long to be selling trucks, yet for our own use, which is on short hauls, freight depot and car loading work, we have fully satisfied ourselves that hauling with horses costs us little more than one-half as much per ton-mile as it would with trucks, and there are multitudes of other concerns in the city situated just as we are.

All the above is more or less preliminary to saying that we strenuously protest against the grossly unfair and malicious method of "running down" the horse as a hauling unit, that is being employed in your magazine and other automotive publications, no so much in text, although that is frequently bad enough, but in the collections of horrible pictures, such as appear on pages 26, 27, 38 and 65 in your December issue. How would the truck men like it, and what would they say about fair play, if the horse men should descend to such ignoble tactics as this on their side of the controversy? If they chose to do so, what beautiful collections of photographs they could get of trucks hopelessly mired in the mud, standing on end in ditches, smashed up in collisions, and so on; and what harrowing accounts of time and money lost in multitudes of specific instances by breakdowns and mechanical delays! What poor propaganda this is, that industriously searches out the exceptional case and attempts to make it appear typical of the experience of all, when it is not so at all!

So far as any of the promotion work of the men who stand for the retention of the horse in industry has come under our notice, it is fair and logical and quite free from the malicious bias which characterizes a good deal of automotive publicity. Do you not think that leaders, like yourself, owe it to your industry to set an example in this matter and confine your publicity to such forms as will stand the test of critical analysis?

LINDSAY BROTHERS COMPANY,
C. E. Woodward.

Minneapolis, Minn.

[If there is one thing which has always formed a basic principle in this journal's policy with respect to the relative merits of horse and motors in industry it is the

(*Continued on page* 68.)

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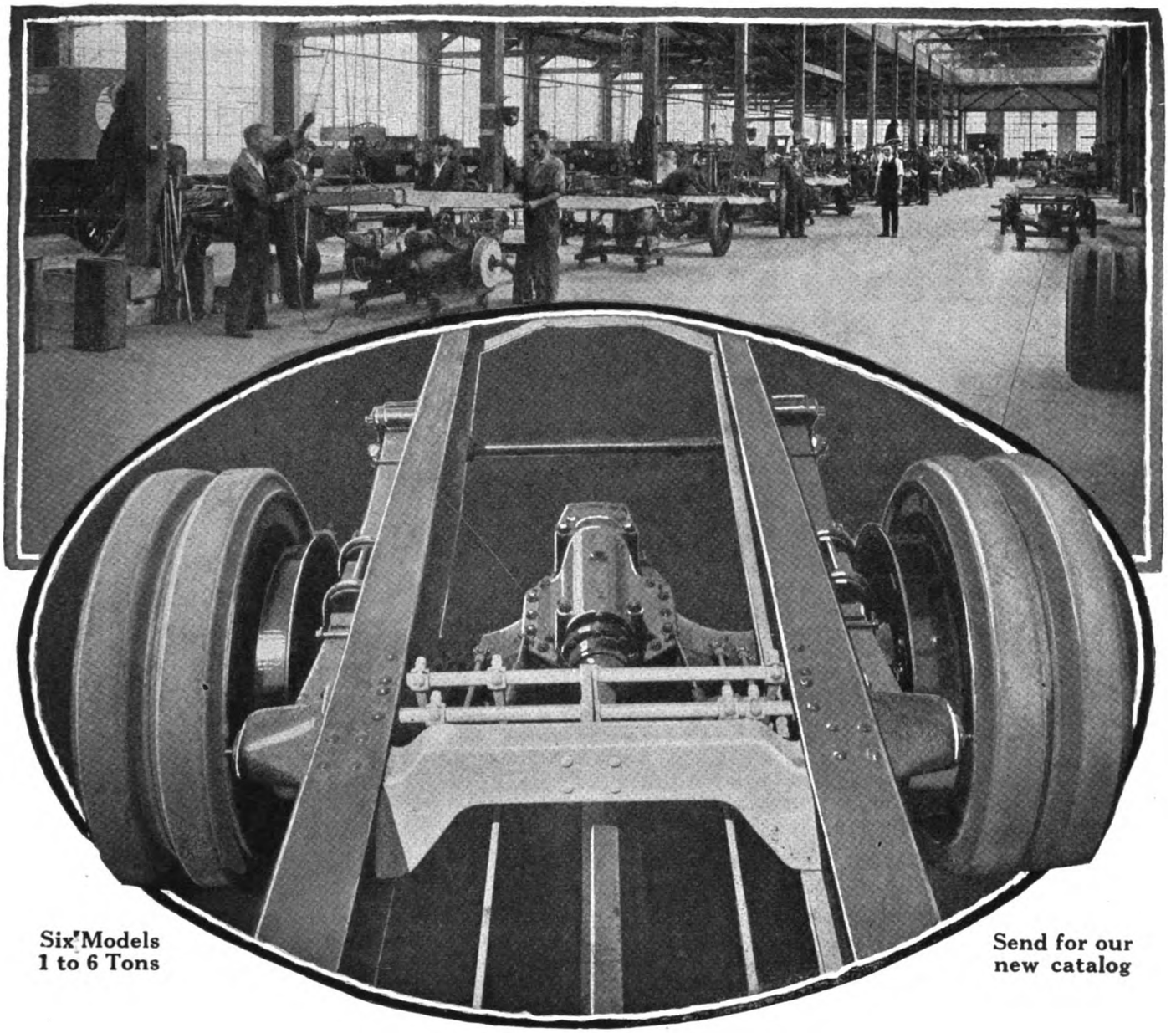

Six Models
1 to 6 Tons

Send for our
new catalog

Built for Continuous Capacity Service

An eastern corporation recently placed an initial order for fifty DAY-ELDER trucks. The requirement was, briefly, capacity load service for each truck from fifteen to twenty hours daily.

Needless to say, the entire motor truck field was thoroughly canvassed before the DAY-ELDER was finally selected.

The exceptional *quality* and dominating *value* of the DAY-ELDER line are always revealed by a careful comparison of all motor truck specifications, performance and prices.

Such a comparison will also reveal the biggest human, cash-in-bank opportunity on the entire motor truck horizon today. Write for particulars.

DAY-ELDER MOTORS CORPORATION **FACTORY AT NEWARK, N. J.**

Detroit Office: 506 Free Press Building

DAY-ELDER

Worm-Drive Motor Trucks

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very spirit of fairness for which our correspondent contends in his earnest yet restrained protest against what he calls a "grossly unfair and malicious method of running down the horse." We have never thought it wise—even could we have been brought to consider it moral—to attempt a commercial incrimination of the horse with the aid of manufactured or garbled testimony, fallacious reasoning, or spurious data. Nor has there ever been a time when such a policy could be found either necessary or expedient. The evidence of the motor truck's economic superiority has always been too abundant to be successfully refuted by equally relevant and trustworthy facts available concerning the horse. Yet we have on numerous occasions been obliged to contradict, by means of the testimony of well known users of horses and motors, the most extravagant assertions made on behalf of the one and in opposition to the other, although always with reluctance lest what was in reality a reply should be construed as an attack. Perhaps for this reason we have found it easier than might be supposed to confine our contentions to "such forms as will stand the test of critical analysis." May we not hope that our correspondent will exert his favorable influence toward the same end with those who are now responsible for the latest form of horse publicity?—Ed.]

The Metric System

To the Editor.—If the bill introduced by Senator Shafforth of Colorado, which provides for the compulsory adoption of the metric system of weights and measures in the United States, is enacted, industry in this country will suffer losses of billions of dollars and will be thrown into a state of chaos that would result in practical paralysis. The propaganda which has been directed by proponents of the metric system while insidious and fallacious, has been wide-spread and successful insofar as it has induced various chambers of commerce and semi-trade bodies to pass resolutions favoring the adoption of the system and to forward them to Congress. These organizations do not, however, represent the manufacturer, who is the one actively concerned in the issue. It fact, it is doubtful whether manufacturers as a whole fully realize that this danger has reached such a menacing status. Transition from our present standards to those of the metric system would mean the introduction of a dual standard as has been the case in other countries where the change has been made. Results would be exactly opposite of those claimed by its advocates—complexity instead of simplicity, confusion instead of order, and diversity instead of uniformity. Not only would there be confusion and loss through the necessity of converting from one standard to the other in commercial transactions, but it would require complete new equipment in many forms of measuring equipment, tools, gages, and innumerable articles of manufacture, not to speak of changes in designs, plans, etc.

Advocates of the metric system argue on the advantages of a uniform world system, but this disappears in the face of the fact that its adoption has in no country brought about a uniform system in domestic affairs, while in most countries it has been a grotesque failure. The most favorable result has been nothing more than a partial change, the old system continuing in use along with the new, and leading to nothing but hopeless complexity, confusion and disorder. If the metric system had possessed any merit, it would have been put into use in this country long ago, not by force of law but by that of expediency. The very fact, that the people of the United States have declined to avail themselves of its principles and to abandon the system to which they are accustomed, should justify the denial of the passage of a law to enforce its adoption. Whatever the nature and purpose of this metric propaganda that is so effectively making its impression in this country, it behooves every American citizen to realize the influence such an enactment would have upon American life and industry, and to act accordingly lest we learn its results when it is too late, as has been the case with other forms of insidious propaganda.

International Motor Co.
R. E. Fulton, *Vice Pres.*
New York City.

C. E. Williams, of Sanford, Dies

C. E. Williams, general sales manager of the Sanford Motor Truck Company, of Syracuse, New York, died suddenly on January 29 at Rochester, following a short attack of pneumonia. Mr. Williams had been with the Sanford Motor Truck Company for over two months, having come direct to that company from the Selden Truck Corporation, of Rochester, with whom he had been asscoiated as sales manager for a long time. While a comparatively young man, Mr. Williams had enjoyed an enviable record in the selling end of the motor truck industry, and was considered one of the most promising of the younger sales officials. Prior to his connection with the Selden Truck Corporation, he was affiliated with the sales department of the Federal Motor Truck Company, of Detroit.

Vital Trade Statistics

Carefully collected data on the annual production of motor trucks and passenger-cars form a valuable feature of the 1920 edition of the Power Wagon Reference Book, which is now ready for distribution. In the new volume are given also detailed statistics of exports and imports, and the first published record of the number of motor trucks in use by states, supplemented by figures showing the distribution of these machines according to the industries in which they are used.

Trailer Specifications

Detailed specifications of more than four hundred trailer models are included in a 50-page section devoted to trailers of all types in the 1920 edition of the Power Wagon Reference Book, now being distributed by the publishers. In addition to data of this kind there are given side elevation and plan view blue-prints of 2-wheeled and 4-wheeled trailers, semi-trailers and trailers of the automobile type. These are followed by an exhaustive article treating the design, application and use of trailers in various lines of business.

Turnbull Changes Name

The Turnbull Motor Truck & Wagon Company, of Defiance, Ohio, changes its corporate name to The Defiance Motor Truck Company. For nearly 45 years The Turnbull Wagon Company enjoyed a reputation as the manufacturer of high grade farm wagons. About two and a half years ago the advent of the motor truck was recognized and a motor truck department was added to the operations of the plant and the name changed to The Turnbull Motor Truck & Wagon Company. Almost immediately afterwards this plant was requisitioned by the Federal Government for the manufacture of artillery escort wagons, but the motor truck department was still continued with a much reduced production, in order to keep it intact.

In the beginning the name "Defiance" was given to the motor truck and it is now decided to discontinue the wagon department, devoting the facilities of the entire plant to the manufacture of motor trucks and motor truck bodies and cabs. The prospects for the future of the company have warranted it in forming plans of national scope both in production and sales campaign.

The following officers and directors are in charge Chas. H. Kettenring, president; Chas. Behringer, vice president; R. Carey May, secretary and treasurer; Harry K. Reinoehl, chief engineer; A. M. Pearson, general sales manager. These officers, together with T. T. Shaw, R. P. Kettenring, F. J. Papenhagen, all of Defiance and Harold S. Reynolds of Toledo, compose the board of directors.

Buys Dorris Truck Plant

An announcement of unusual interest to the automotive world was made recently when the Dorris Motors Corporation, of St. Louis, with a capitalization of $3,000,000, was organized through the merging of the interests of the Dorris Motor Car Company and the Astra Motors Corporation. The purchase of the entire assets and good will of the Dorris Motor Car Company was made known by B. R. Parrott, who was formerly president of the Astra Motors Corporation.

The new firm will manufacture Dorris passenger cars and motor trucks at the present Dorris plant. Immediate expansion of this plant by building upon adjoining property is planned. Plans for a new 3-story building 180 by 200 feet are now in hand. At present the Dorris Motor Car Company employs 443 people. This will be increased to 1,000 by July 1.

Increase of the motor truck business has been enormous. Where the business of manufacturing motor trucks was over 75 per centum off last January, it is now more than 75 per centum in advance of the best months known.

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Hauling 14,630 Pounds

The above photograph shows a 3½-ton truck and a 2¾-ton WARNER TRAILER hauling a 14,630 pound load. The distance was 56 miles over rough, rutted roads. The round trip for the truck and trailer was made in twelve hours.

This is only one of the instances of the way WARNER TRAILERS are solving the hauling problems and reducing hauling costs. In addition WARNER TRAILERS lower maintenance costs, reduce labor and speed up delivery. Many concerns have been able to save the purchase cost of additional trucks because WARNER TRAILERS in some size and shape multiply the efficiency of trucks already in service and do more work with less labor and at a lower cost.

Each WARNER TRAILER is scientifically built. Just as much care is taken as in building a high grade motor truck. In many respects the Warner Heavy Duty Truck Trailer is a truck chassis minus the power plant.

WARNER TRAILERS are solving hauling problems for firms in widely different lines of business. Let us show you how it will do the same thing for you. The advice of our Engineering Department is gratis.

WARNER MANUFACTURING COMPANY
26 Main Street, Beloit, Wis.

WARNER

HEAVY DUTY TRUCK TRAILERS

TWO AND FOUR WHEEL TYPES

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Merit and Demerit Plan Satisfies Fleet Drivers

HAVE REPRESENTATION ON ARBITRATION

Merits and demerits for drivers is the method employed by the Liquid Carbonic Company, of Chicago, to encourage the efficient operation of its motor truck fleet. The demerits and merits are given for all things coming up in the daily operation of the motor trucks. Extra merits are given for special work or interest. All bonuses are distributed in accordance with the grade a man receives. The plan is based on a possible 100 per centum which brings a bonus of 10 per centum of the average wages paid all chauffeurs during the period.

A bonus to drivers is nothing new for this company. It has experimented with other forms of compensation until the present system was put into effect April 1, 1919. It is proving a real success. The few questions that have arisen regarding justification of demerits being satisfactorily settled by a board consisting of three persons: One representing the chauffeur, one the plan and the third the traffic department.

Following is the schedule by which the merits and demerits are awarded:

CHAUFFEURS' EFFICIENCY BONUS PLAN.

Merits and demerits will be given for the Condition of the Motor Truck, Accidents, Personal Efficiency, and General Efficiency. The scale follows:

	Maximum No. of demerits.
Condition of motor truck to include:	
Lubrication	25
Cleanliness	5
Minor repairs which can be made	15
Condition of tires as to inflation	20
Accidents:	
To be graded according to damage done and responsibility	50
Personal efficiency to include:	
Willingness to perform extra duty	5
Immediate compliance to orders and instructions	5
Loss or damage to goods while in transit	25
General Efficiency:	
Making out of motor truck records and material requisitions	5
Carefulness in operation of motor truck	15
Speeding	10
Excess tire trouble	5
Any other conditions which may warrant	50

Extra Merits, 1 to 10:

Motor truck records for each day correctly made out.

Material requisitions for all gas and oil used to balance with motor truck records.

Extra duty performed or any other conditions which may warrant.

Suggestions for the improvement of delivery system after they have been approved and put into effect.

For attending Packard Truck Drivers' Instruction Course. Required attendance at ten meetings to get merits for answering questions. For example, a grade of 70 earns 7 merits; 80, 8 merits, etc.

Tractor Unit Hauls 45-ton Load

About three years ago E. C. Dunbar conceived the idea of furnishing crushed stone to the building and paving interests of Detroit and vicinity and erected a plant for this purpose, using the stone blasted from the Livingston Channel as his source of supply. The question of deliveries was, of course, Mr. Dunbar's greatest problem and after trying various hauling units he decided to use the tractor-trailer method and as a result of this decision purchased several Knox tractors and had constructed for him a number of 12½- and 15-ton trailers with gravity dump bodies to facilitate quick unloading. These units were placed in operation by using a semi-trailer connected direct with the tractor to give the traction and coupled one or two trailers behind to increase the hauling capacity of the unit. The experiment worked out so nicely from the start that other units were added and a load of from 28 to 45 tons is being hauled, making a speed as high as 12 miles an hour and hauling a distance of a maximum of about 15 miles from the plant. This stone is furnished at a very low cost because the hauling has been decreased to about 2 cents per ton-mile and one of the larger units delivers as high as 180 tons of crushed stone per day. A very accurate system of cost records is kept and it is generally known among motor truck transportation interests that Mr. Dunbar is one of the best informed authorities on hauling costs in the country.

Truck Specifications

More than two hundred facts of general and special interest concerning each of hundreds of American- and Canadian-made motor trucks are given in an extensive section devoted to engineering and selling data in the 1920 edition of the POWER WAGON REFERENCE BOOK. The machines described are arranged for convenience according to their carrying capacities, so that vehicles of like load-rating can be readily compared. By a simple system of cross-reference the reader is led from frequently sought information to that required only in answer to unusual questions.

The speedy approach of universal good roads will bring about the ideal condition for the use of motor trucks. Boosting good roads is buttering your own bread.

Must Build Terminals for Either Horses or Trucks

INTERMINGLING OF TWO CAUSE CONGESTION

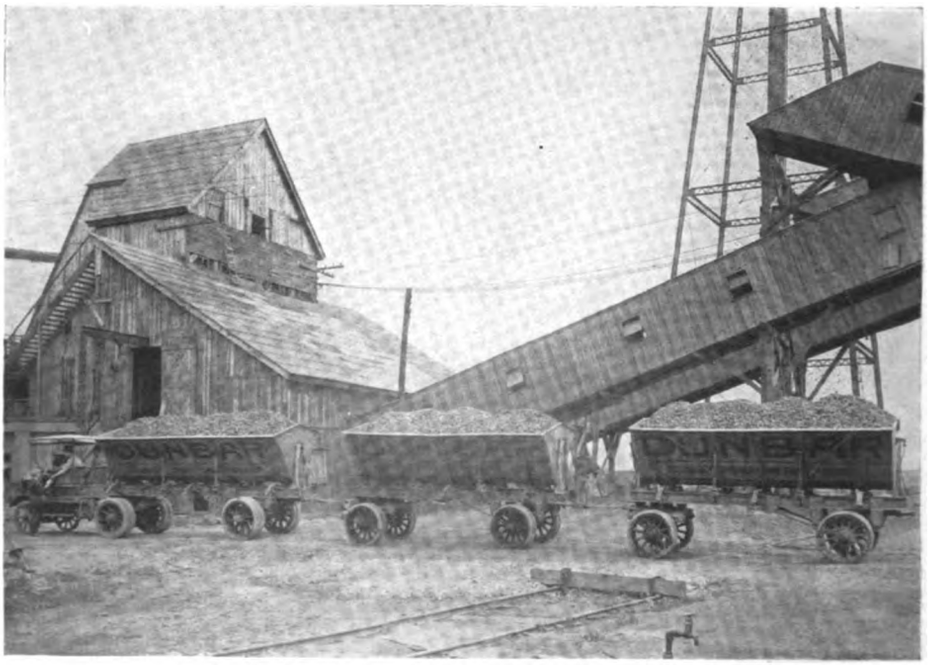
An authority on marine freight terminal operation recently declared that if all horse transportation at our docks should be displaced by motor trucks, the number of vehicles required to carry the same daily tonnage would be one-tenth the number used at present.

The congestion at our ports and the anticipated methods of handling freight on outgoing and incoming vessels have long been a matter for general criticism without in the least abating the cause for that criticism.

At least one of the factors that would relieve this congestion according to M. L. Pulcher, vice president and general manager of the Federal Motor Truck Company, would be the more general use of motor trucks and the elimination of the horse, as the two absolutely do not mix, and facilities at the ports must be built for one or the other.

"It is a well known fact," declared Mr. Pulcher, "that a motor truck costs considerably more to operate than a horse dray. But since the motor truck is capable of carrying ten times the daily tonnage, the cost is proportionately lower compared with the service rendered.

"The average dray probably hauls a load of 4 tons and makes about 2 round trips. The daily tonnage delivered may be about 10 tons. Motor trucks rented in New York on a 50-mile-per-day basis, with average hauls of 4 miles, will make 11 loads a day easily. A 5-mile an hour speed is necessary going 10 miles a day. In such a day's work a motor truck could deliver 110 tons, with return loads. Thus an estimate of 80 tons a day is conservative."



Tractor hauling 45-ton load of stone.

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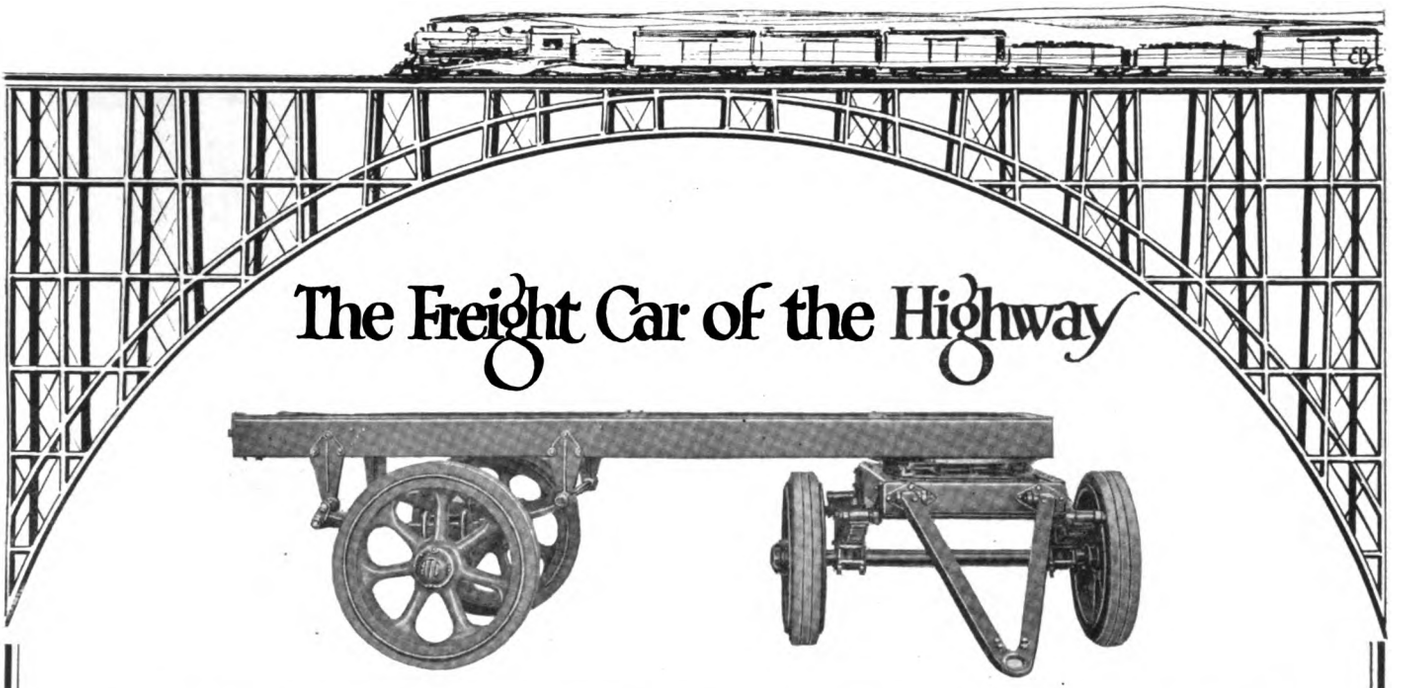

The Freight Car of the Highway

AUTOMOTIVE TRAILERS

Bridging the gap between unprofitable and profitable transportation you find the Automotive Trailer. A locomotive never goes out with freight loaded on the tender—it hauls its load and with profit.

Application of railway principles to your transportation problems will give three times the carrying capacity of one truck operated alone. Make your truck the locomotive of a trailer train.

We offer distributors a very interesting cooperative sales plan. Full information furnished on request.

COMPLETE LINE

4 wheel Semi Pole 2 wheel

1 to 15 ton capacity

AUTOMOTIVE TRAILER CORPORATION

General Office
1442 McCormick Bldg., Chicago, Ill.

Factory
Kincaid, Ill.

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Introducing four New Models

Strength! Power! Service!

Things that motor truck users of today insist upon. Qualities you as a dealer must look for in selecting a line of trucks to sell.

For 12 years, United States Motor Trucks have satisfied dealers and users on these and many other requirements.

The 1920 models emphasize, to a far greater degree, these features of United States Motor Trucks.

Look at the models on the opposite page. What do you see? Strength—massive, not too heavy for the service they must perform. Powerful—plenty of power for any emergency—not overpowerful or wasteful of energy.

Combine the two—Strength and Power—and get Service. United States Motor Trucks, always efficient in operation, permit great savings of oil, gasoline, tires and repairs.

Two years ahead in engineering design, construction, materials and refinement of details. Many unusual features, all incorporated for the first time in one line of trucks, are to be found in these new models.

Floating Power Plant. Special U. S. motor with hot spot manifold. Vacuum Feed. Worm drive. Seven inch cushions for driver's comfort. Hotchkiss drive. Cast radiator with vertical tubes. Three-piece hood. Fireproof dash. Worm and block type steering gear. I-beam front axle. Multiple disc clutch. Four speed transmission. Tubular drive shafts equipped with noiseless and oilless universal joints. Silico-manganese springs.

Each part has proven itself the correct unit by rigid test. Each part will perform as expected. Each part gives the added factors of safety so needed in heavy duty trucks.

DEALERS

You are going to sell motor trucks. Sell a complete line, one that fills every hauling need of your customers'. The United States line with a wide range of haulage capacities is the one you need.

The United States line spells "Opportunity" for you. It means money, success and satisfied customers.

Reserve your territory before it is gone. Don't let your competitor get in ahead of you.

Our dealer proposition is especially attractive to all, whether you are a new dealer, or an established dealer contemplating a change.

ADDRESS

W. R. KYLE,
The United States Motor Truck Company
Cincinnati, Ohio.

The United States Motor Truck Company

INCORPORATED

CINCINNATI, OHIO

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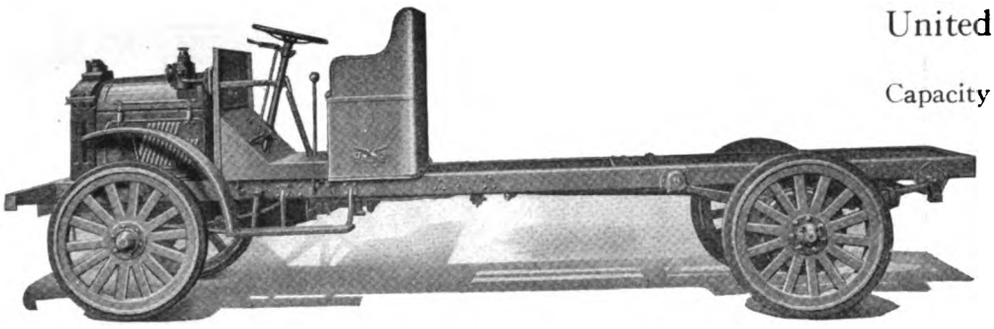
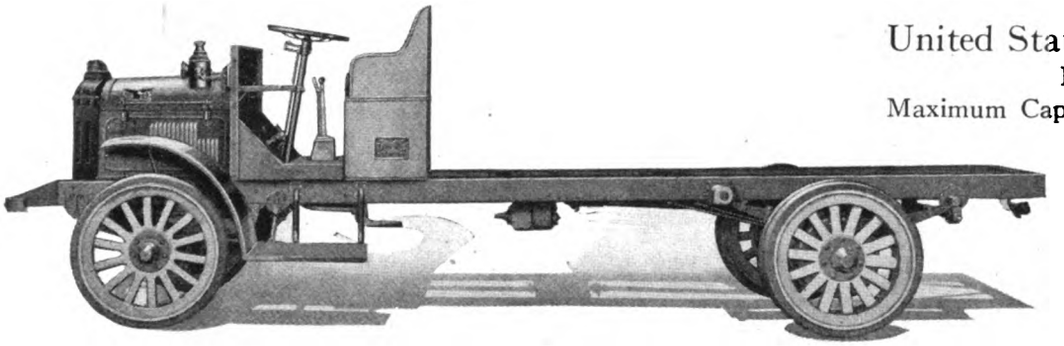
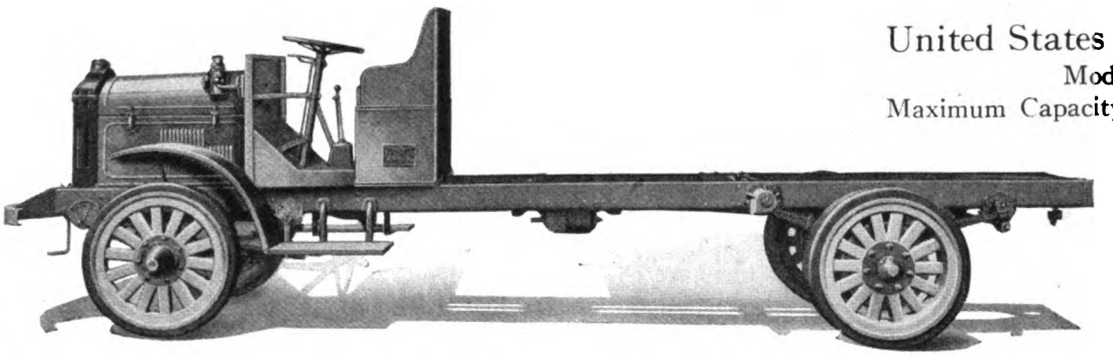


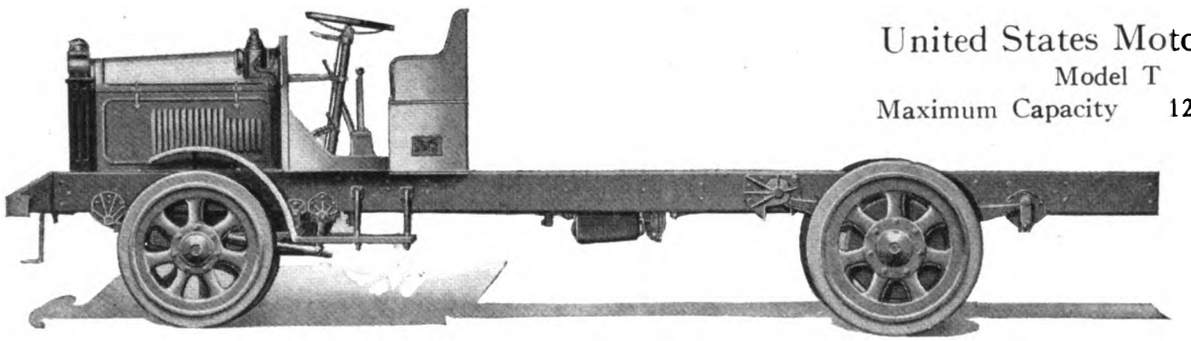
United States Motor Trucks
Model NW
Capacity - - - 1½ tons



United States Motor Trucks
Model R
Maximum Capacity 6,000 pounds



United States Motor Trucks
Model S
Maximum Capacity 8,000 pounds



United States Motor Trucks
Model T
Maximum Capacity 12,000 pounds

United States Motor Trucks

FLOATING POWER PLANT

"AS GOOD AS THE NAME"

Please mention "Power Wagon" when writing to advertisers.

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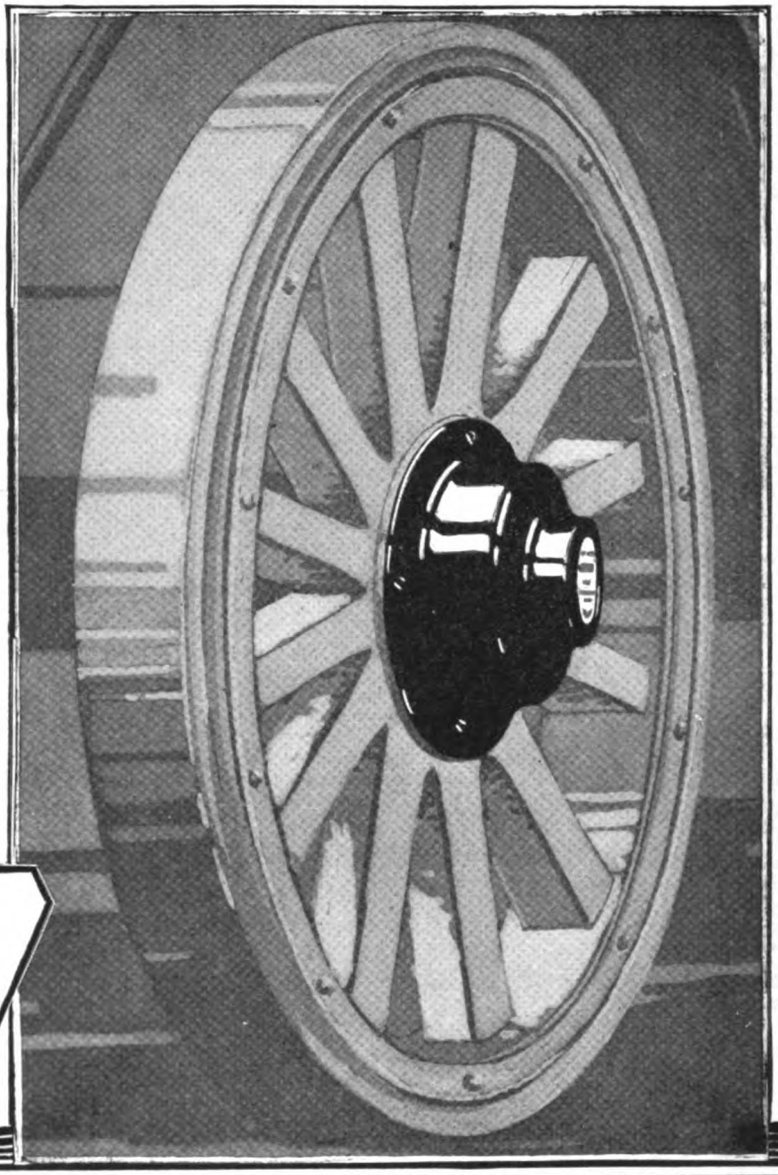


JOHNS-MANVILLE SERVICE COVERS THE CONTINENT

Through—

Asbestos

and its allied products

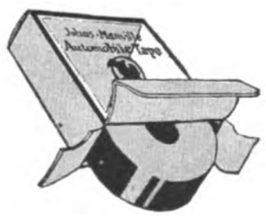
JOHNS-MANVILLE
Serves in Conservation

Heat Insulations, High Temperature Cements, Asbestos Roofings, Packings, Brake Linings, Fire Prevention Products

JOHNS — AUTOMOTIVE

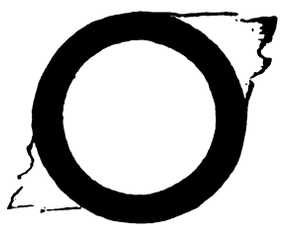
Johns-Manville Non-Burn Asbestos Brake Lining

Non-Burn is the representative of Johns-Manville Asbestos to the owners of Trucks and Commercial Cars. That's one reason why it is so dependable. Brakes last longer with Johns-Manville Asbestos Brake Lining.



Johns-Manville Automobile Tape

This tape is guaranteed to be satisfactory. We know it is good—that's why we back it up.



Johns-Manville Clutch Facing

When you have clutch facings renewed, remember that the quality, wear-resistance and gripping power of Johns-Manville Clutch Facings are the result of years of experience, of which you get the benefit.

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How to know your trucking costs

OF COURSE you know what you pay your drivers and helpers —what repair charges are—how many tires and how much oil or gas you've had to buy.

But do you know what each truck costs per mile? Do you know if each trip is making all the profit it should for you? Are you taking your employee's guess at mileage in your estimates of gas and oil consumption or for tire adjustments?

You can know exactly how far each truck has traveled—how many miles it got out of a gallon of gas—whether your tires are giving the service they should—with the Johns-Manville Hubodometer.

This instrument will record accurately, the distance traveled, backward or forward. It records every revolution of the wheel—daily, weekly and monthly, in cumulative totals up to 10 000 miles, and then repeats. There is no worry about upkeep expenses, it's too simple to get out of order.

Install a Johns-Manville Hubodometer on each truck and know what your trucking actually costs.

H. W. JOHNS-MANVILLE CO.
New York City
10 Factories—Branches in 63 Large Cities
For Canada: Canadian Johns-Manville Co., Ltd., Toronto

Price $12.00
$12.50 West of Denver

MANVILLE
EQUIPMENT

The Jones Recorder

On a chart of sensitized paper, which cannot be tampered with, this instrument records a complete, accurate and permanent history of the performance of your cars, every minute of the day. In addition, the Jones Recorder shows the total mileage up to 9,999 with trip mileage up to 99.9.

Put this instrument on your cars and learn the truth.

Johns-Manville Automotive Mogul Packing

Need a good twisted or braided packing for the water pump or some similar place? Buy a spool of Mogul Packing and see how well it does the job, besides acting as a natural lubricant.

Johns-Manville "Noark" Automobile Lighting Fuses

"Noark" on a fuse means safety for your batteries. You can depend on "Noark" to operate with positive accuracy.

Please mention "Power Wagon" when writing to advertisers.

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WOOD Wheels outlive the car —always

Positive proof of this can be found in the yards of dealers in junked autos. You will see there huge stacks of WOOD Wheels —antiquated but still good.

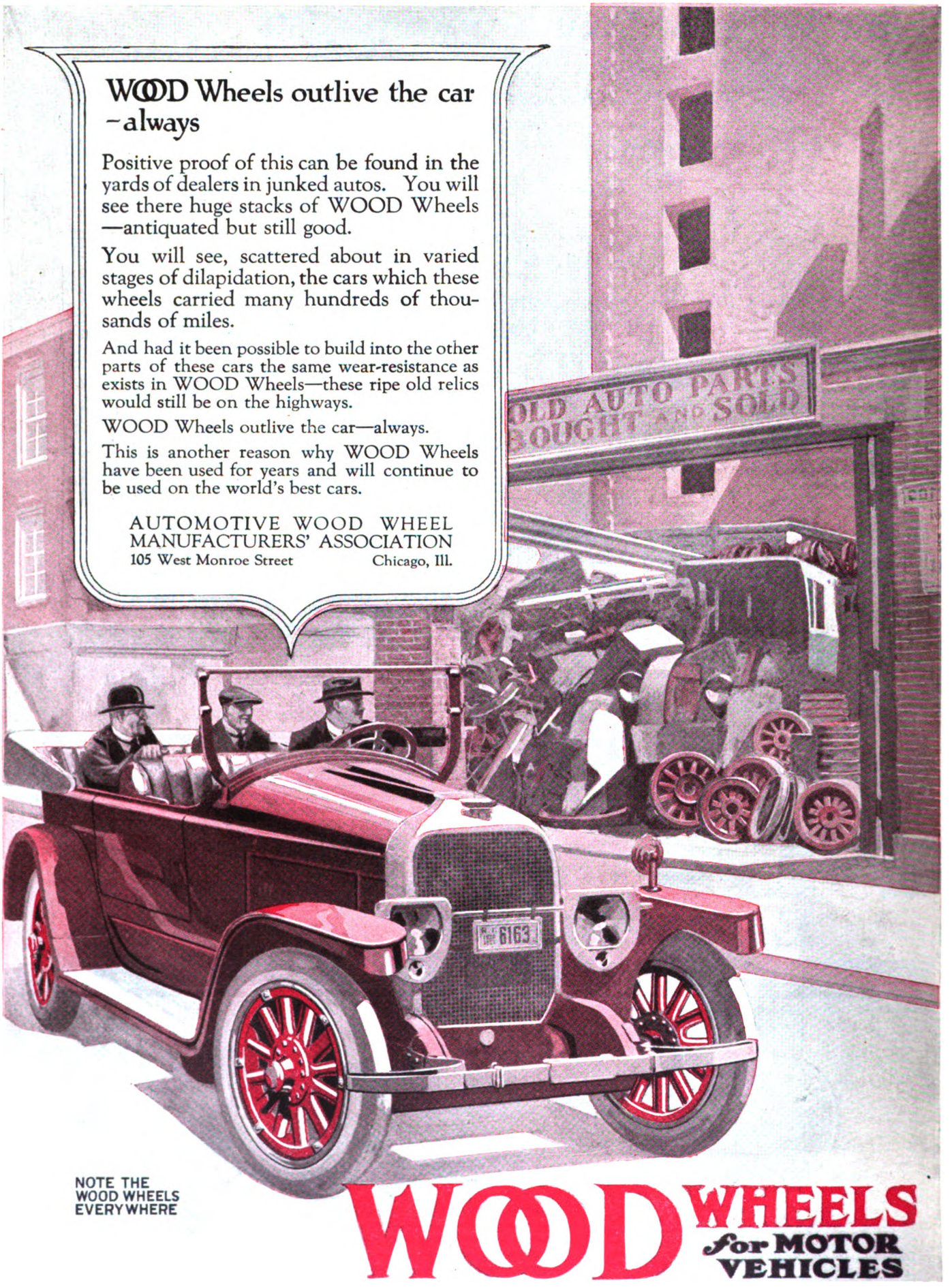
You will see, scattered about in varied stages of dilapidation, the cars which these wheels carried many hundreds of thousands of miles.

And had it been possible to build into the other parts of these cars the same wear-resistance as exists in WOOD Wheels—these ripe old relics would still be on the highways.

WOOD Wheels outlive the car—always.

This is another reason why WOOD Wheels have been used for years and will continue to be used on the world's best cars.

AUTOMOTIVE WOOD WHEEL MANUFACTURERS' ASSOCIATION
105 West Monroe Street Chicago, Ill.



NOTE THE WOOD WHEELS EVERYWHERE

WOOD WHEELS for MOTOR VEHICLES

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$50,000,000 of Federal Sales

3-2 Ton operated by H. J. Heup, Hales Corners, Wis. Hauling milk

2 Ton operated by Oklahoma Furniture and Mfg Co., Oklahoma City, Okla.

Operated by Mistele Coal and Coke Company Detroit, Mich.

5 Ton operated by Brownell & Field Co., Providence, R.I.

2 Ton Federal operated by Mr. Eastman, San Diego, Cal. Eastman Fruit Co.

This is the sign of the "Tenth Year Federal." A sign significant of ten years of success in every field of truck transportation.

2 Ton with stake body, Columbia Motor Co.

2 Ton operated by Milwaukee Woven Wire Works, Milwaukee, Wis.

The fact that over $50,000,000 has been spent for Federal Trucks during the past ten years speaks plainly of the confidence in which the public holds Federal.

Nothing that we know of could evidence more plainly the present value of a Federal dealer's franchise.

FEDERAL MOTOR TRUCK CO.
DETROIT, MICHIGAN

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BOSCH

Satisfied Buyers Mean Your Success

Satisfied customers are your best salesmen. Insure satisfaction by giving them an ignition system that you know is absolutely dependable and efficient — Bosch High Tension Magneto Ignition.

The experienced buyer knows and others are learning fast that in Bosch they have dependability in perhaps the most vital unit of the entire truck, and he knows the Bosch. Service organization provides prompt and expert service when needed.

The truck dealer who insists on Bosch Magneto equipment at the factory insures dependability in the trucks he sells. Be satisfied. Specify Bosch.

AMERCIAN BOSCH MAGNETO CORPORATION
Main Office and Works: Springfield, Mass.
Branches: New York, Chicago, Detroit, San Francisco
Three hundred service stations in three hundred centers

AMERICA'S SUPREME IGNITION SYSTEM
MOTOR TRUCKS – TRACTORS – AIRPLANES – MOTOR CARS – MOTOR BOATS – MOTORCYCLES – GAS ENGINES – ETC.

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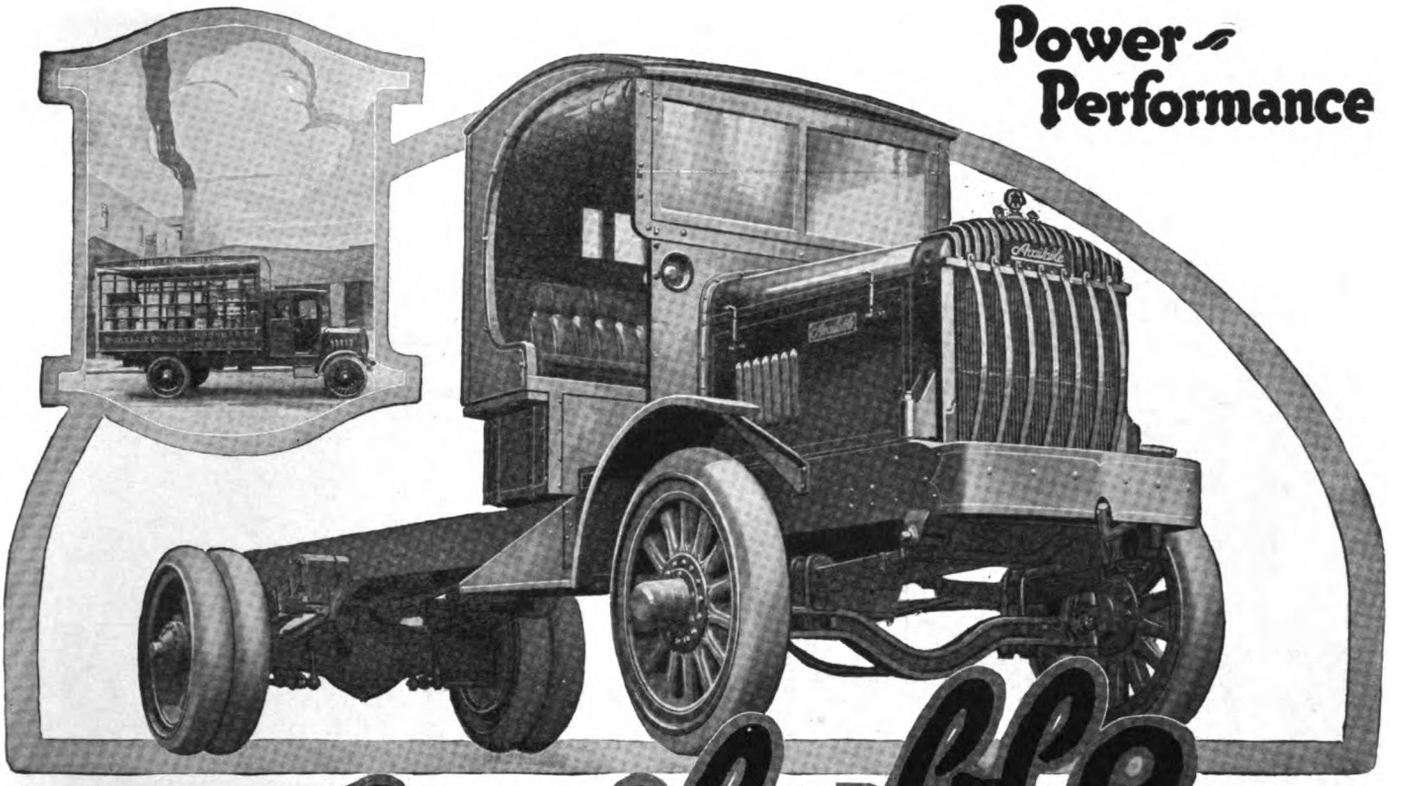
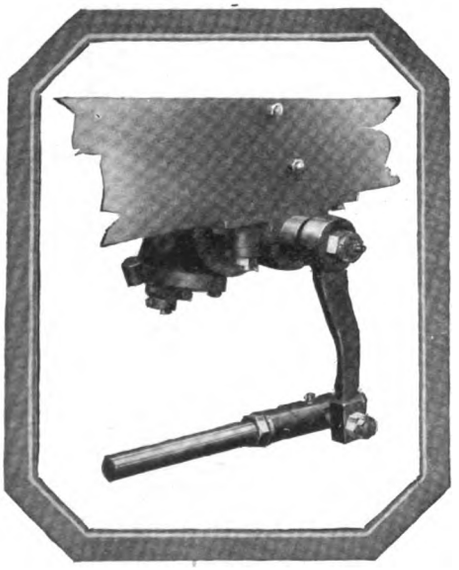
Power & Performance



Available Trucks

Feature No. 4



Steering Gear Mounting

A rigid, easily demountable assembly, featured by the splitting of bearing which holds the drop arm shaft. First, remove the drop arm from its shaft, then loosen nuts on shaft bearing, and demounting is complete. Free access is instantly obtained for replacements or removal of steering column.

Solid bolting of shaft bearing through both flange and vertical sections of frame eliminates troublesome looseness found in less rigid assemblies. It is proof against road jars, frame vibration and driver's roughness.

Connection of drop arm and fore-and-aft rod by ball and socket joint permanently binds these important steering members, while positive insurance against failure and accident is effected by accurately taper fitting the drop arm to the shaft.

Write us for detailed information. Address Dept. G.

AVAILABLE TRUCK COMPANY

Kilpatrick and North Avenues Chicago, Ill.

AVAILABLE ALWAYS SINCE NINETEEN TEN

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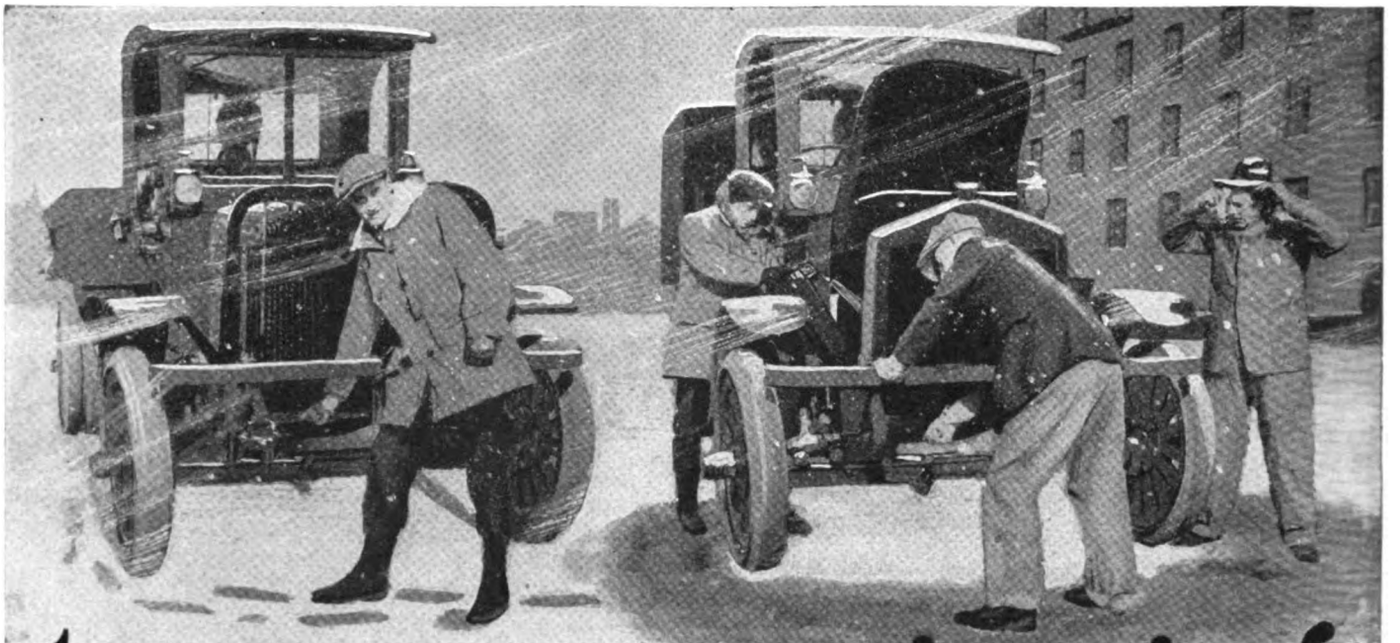
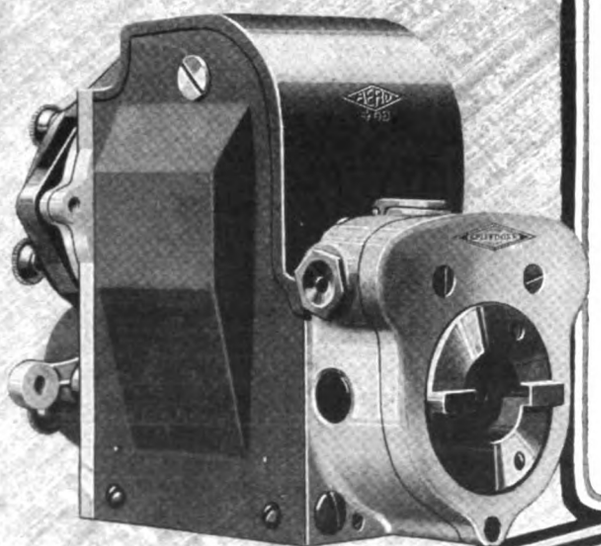


1/4 turn vs. spinning

Splitdorf "Aero" Magneto with Enclosed Automatic Impulse Starter

Standard equipment on such trucks as Mack, Pierce-Arrow, Garford, etc.



A cold, stiff engine will start easily if equipped with Splitdorf Magneto and Enclosed Automatic Impulse Starter. No back-breaking effort necessary even when the thermometer hovers around zero.

The Impulse Starter is a part of the coupling used in driving the magneto.

A quarter turn of the crank shaft, on compression stroke, releases a spring within this device. The released spring energy twirls the magneto shaft to a speed far in advance of the crank shaft speed, producing an extra hot spark in the charge to be fired. The stiffest engine starts instantly.

The cutting in and cutting out of the Splitdorf Impulse Starter is entirely automatic. When the Impulse Starter is functioning the spark is automatically retarded regardless of spark-lever position, positively eliminating back-firing.

Safe and dependable—always dependable.

SPLITDORF ELECTRICAL COMPANY
Newark, N. J.

TRADE
SPLITDORF
MARK

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Form 1201

WESTERN UNION TELEGRAM

NEWCOMB CARLTON, PRESIDENT GEORGE W. E. ATKINS, FIRST VICE-PRESIDENT

CLASS OF SERVICE	SYMBOL
Telegram	
Day Letter	Blue
Night Message	Nite
Night Letter	N L

If none of these three symbols appears after the check (number of words) this is a telegram. Otherwise its character is indicated by the symbol appearing after the check.

RECEIVED AT 121 SOUTH 10TH ST., TERMINAL BLDG., LINCOLN, NEB. ALWAYS OPEN

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473

HEBB MOTORS COMPANY
LINCOLN NEBRASKA

THE WONDERFUL PERFORMANCE OF PATRIOT TRUCKS IN TEXAS HAS BEEN SO UNUSUAL THAT OUR PRESENT SCHEDULE OF SHIPMENTS ARE DECIDEDLY INADEQUATE YOU HAVE RECEIVED OUR ORDERS IN THE PAST THREE WEEKS FOR SOME TWENTY CAR LOADS OF TRUCKS AND WE ESTIMATE OUR FUTURE NEEDS AT ONE HUNDRED TRUCKS PER MONTH

THOMAS PEASE MOTOR CO

440 AM OCT 10

Patriot Motor Truck Performance everywhere is such that Distributors and Dealers find sales easily made and "repeat bussinss" assured.

Hebb Motors Co.
Manufacturers
1419 P St. Lincoln, Neb.

PATRIOT

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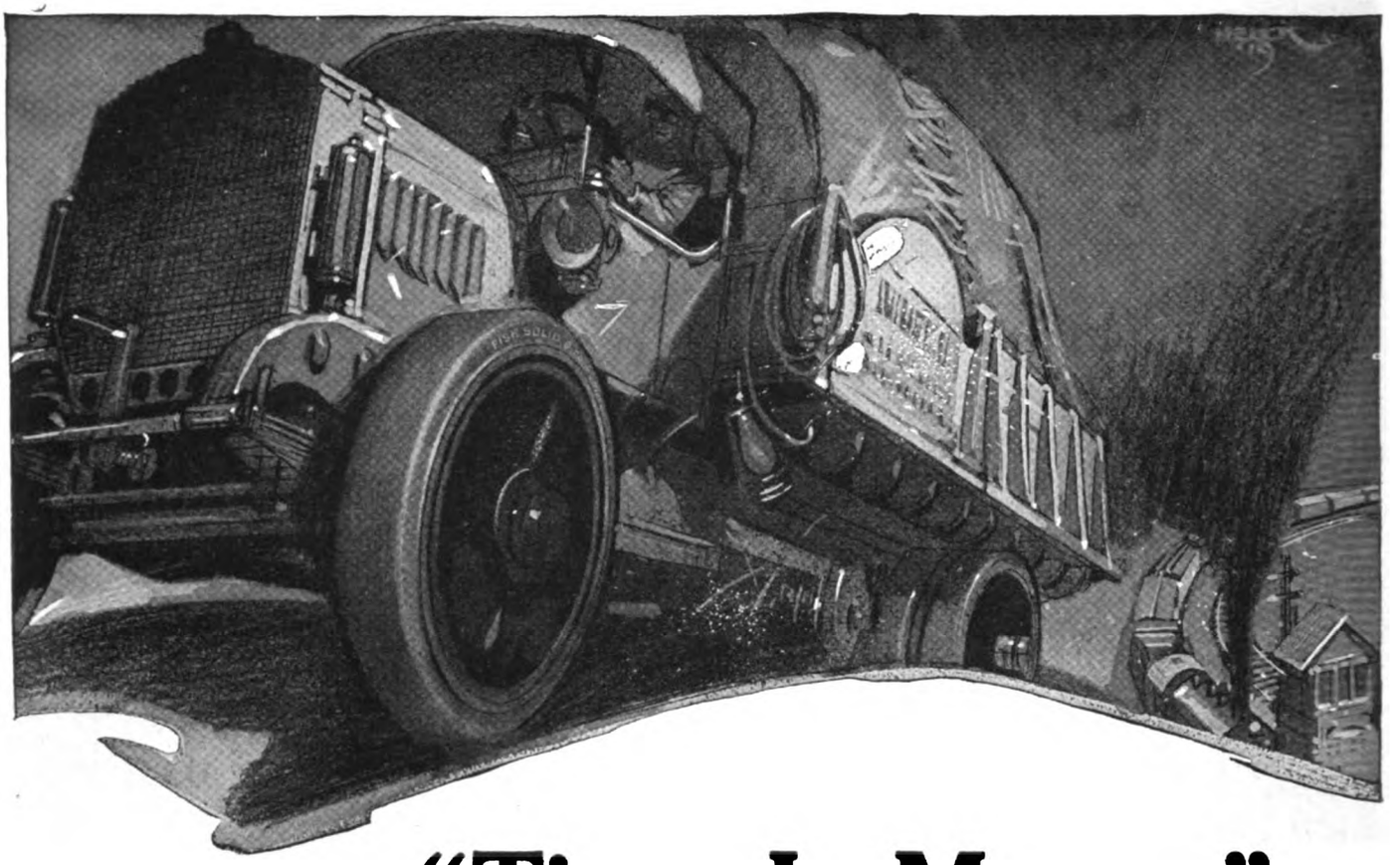

"Time Is Money"

AN old saying, but, since the dealer is constantly in contact with truck owners who insist that their trucks shall run exactly on schedule, this old saying now has a specific meaning.

The time (and money) saved by Fisk Truck Tires is a constant source of sales. The truck owner who uses Fisk Solid Tires or Fisk Pneumatic Truck Tires gets a mileage and a shock-protection from them which make him "boost" Fisk Truck Tires for you everywhere. Investigate the Fisk line—you will find that Fisk holds old friends and constantly makes new customers.

Next time—BUY FISK

The Fisk Ideal is: "To be the best concern in the world to work for, and the squarest concern in existence to do business with".

FISK TRUCK TIRES

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Commerce TRUCKS

Commerce TRUCKS

They Make Good On Any Job

—*Commerce Owners Tell You That*

A truck built of the stuff Commerce is made of could not fail to make good ***and they have for ten years.***

Every vital part of the Commerce Truck is made by a specialist with a national reputation for a high grade product.

Check this list of units possessing unquestionable performance records—more than can be found in any other make of truck built.

Continental Red Seal Motor
Torbensen Rear Axle with Timken Bearings
Detroit Gear Co.'s Transmission
Highland Commercial Bodies
Detroit Steel Products Springs
Eiseman Magneto and Impulse Starter
Spicer Universal Joints
Willard Storage Battery
Zenith Carburetor
Stewart Vacuum System
Jacox Steering Gear
Bijur Electric Generator
Commerce Own Design Radiator
Champion Spark Plugs

It is not a question of The Commerce Motor Car Company being able to merchandise its product in 1920. It is just a question—if you are a good enough business man to make money—for you to investigate the Commerce Truck and the Commerce Franchise for your territory.

Commerce Dealers Must Make Money

The Commerce Motor Car Co. Detroit, Michigan

10TH YEAR MFRS. OF MOTOR TRUCKS

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MR MARLIN-ROCKWELL INDUSTRIES MR

Undivided Control of Operations

FROM the making of the raw steel to the shipment of the finished product, undivided control of operations gives complete coördination of manufacture both as regards the quality and volume of production of

SRB

Single Row Double Row

ANNULAR BALL BEARINGS

The Braeburn Steel Mill, pioneer in tool steel products, with its immediately adjacent coal supply and its own gas wells, affords a source of Electric Furnace Bearing Steel equally reliable for highest attainable quality and constancy of supply.

Subsequent mechanical processes are balanced and coördinated up to the last operation, so that the many times multiplied demand for S. R. B. Bearings is being met with a production that would be impossible with facilities one degree less complete.

This expansion of manufacture is under conditions that assure full maintenance and even further refinement of the quality which has made S. R. B. Bearings standard equipment for those automobiles, trucks and tractors whose names are instantly thought of as leaders in their respective fields.

STANDARD
STEEL AND BEARINGS
Incorporated

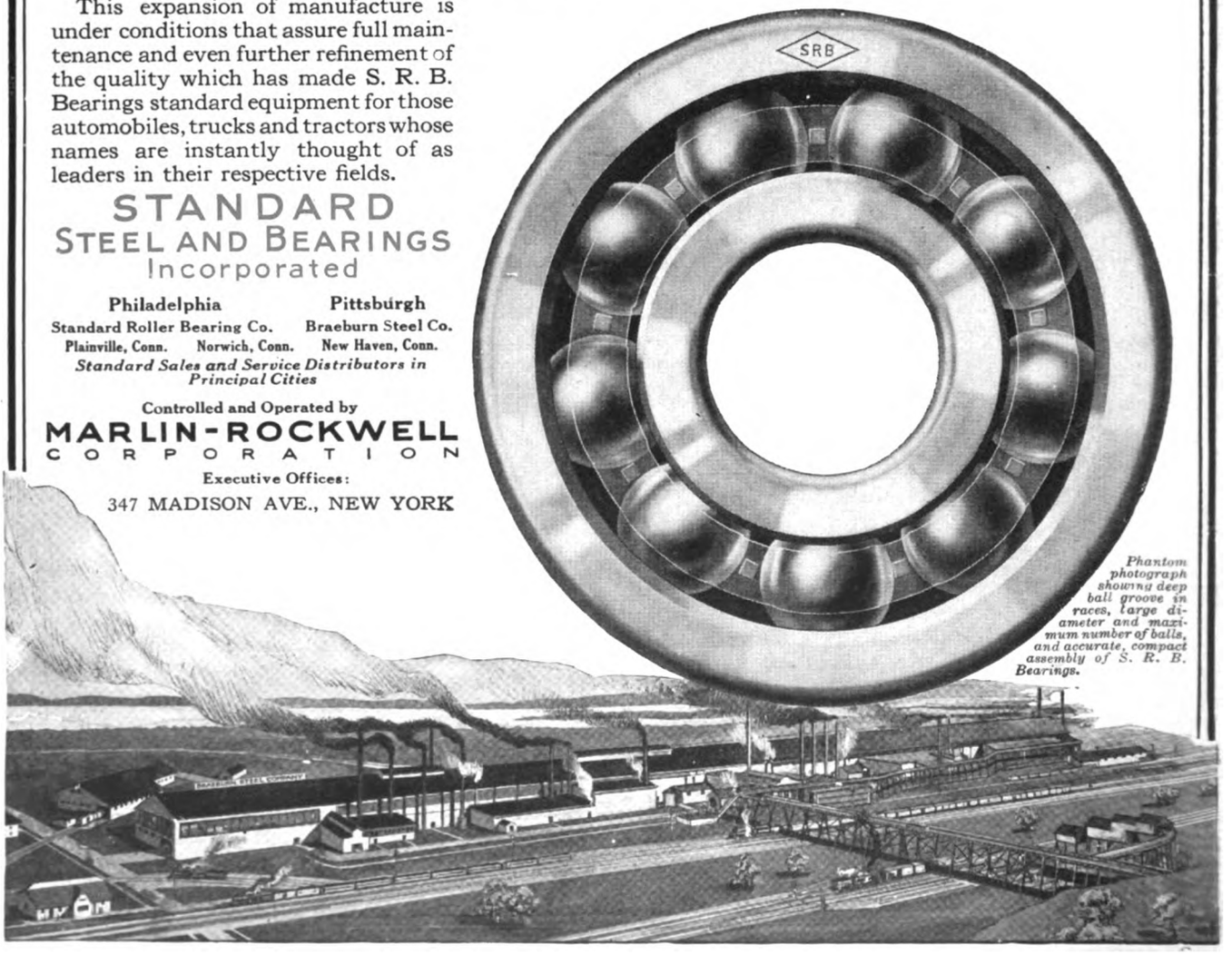
Philadelphia — Standard Roller Bearing Co., Plainville, Conn. Norwich, Conn.

Pittsburgh — Braeburn Steel Co. New Haven, Conn.

Standard Sales and Service Distributors in Principal Cities

Controlled and Operated by
MARLIN-ROCKWELL
CORPORATION

Executive Offices:
347 MADISON AVE., NEW YORK



Phantom photograph showing deep ball groove in races, large diameter and maximum number of balls, and accurate, compact assembly of S. R. B. Bearings.

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General Motors Trucks

The Big Message In GMC Truck Success

The clearest and plainest message that can be told to a prospective buyer of GMC Trucks is that GMC Trucks get there and back.

Stripped of fine distinctions in phraseology and mechanical explanations, this is the test of a truck.

Volumes may be written about the machinery of a motor truck, but, after all, what the user wants is to get there and back.

GMC Trucks do just that, which makes long explanations unnecessary.

GMC engineering is just common sense truck building having in view the utmost dependability.

As to GMC quality, that is just plain, honest quality—also common sense.

Back of these things is the stability of the exclusive truck making unit of the General Motors Corporation.

GENERAL MOTORS TRUCK COMPANY

One of the Units of the General Motors Corporation

PONTIAC, MICH., U. S. A.

(628)

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Whence comes this extra power?

First—From the proper conception of the daily duty demanded of a truck or tractor engine.

Second—From a design thoughtful of all contingencies of the days work.

Third—Through the workmanlike execution of this thoughtful design in a highly specialized engine plant.

————The absence of vibration, the insurance against whipping and dis-alignment of the crankshaft, the ample bearing surfaces and positive lubrication, all combine to transmit ***all*** the power generated into actual driving force.

The Hercules Motor Mfg. Company

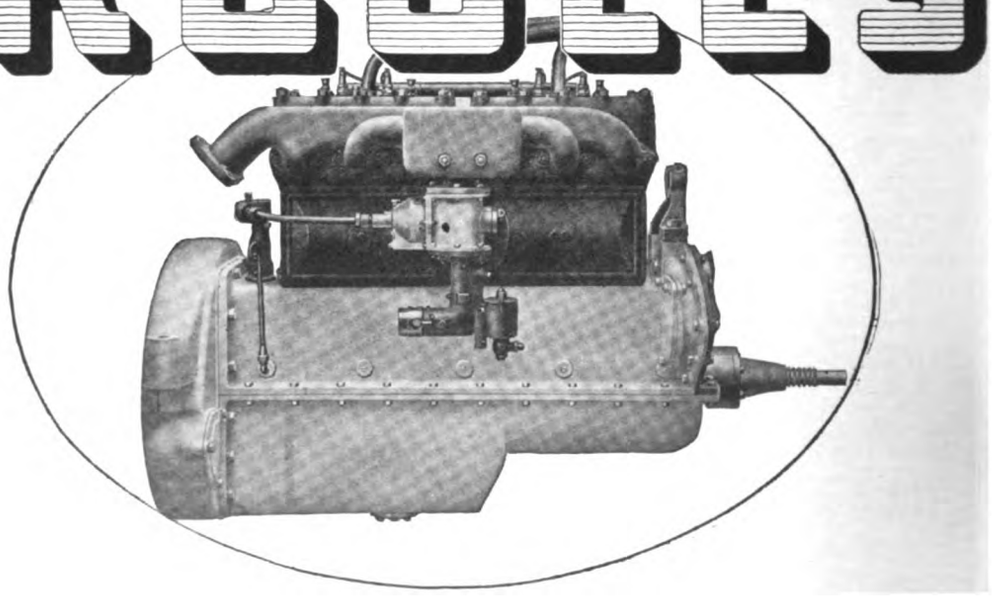
CANTON OHIO

Sales Offices:

Detroit Chicago Buffalo San Francisco London, England

HERCULES

For Trucks and Tractors



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What is the Real Factor which Determines the Buying Decision

By George A. Kissel

Motor transportation has entered upon a new era—at a time in the manufacturing, industrial and transportation condition of the country when dependability, economy, adaptability and confidence are absolute necessities. There can be no temporizing. Your transportation problem is not merely the selection of a truck—it is the adoption of a basic principle—of relying on your confidence in the maker and in the efficiency of his product.

But, what is this controlling impulse that leads you to accept without question certain commodities at their face value and approach others with doubt and hesitation?

It's Confidence! Confidence is the real factor which determines the buying decision—confidence created by age, reputation, performance, stability, permanency, and consistent service over a long period of time.

It takes many long years to create confidence in a product to that point where the mere mention of the manufacturer's name carries conviction to the buyer that his confidence can be safely placed.

There is no secret about building trucks—factories can be duplicated—so too, the motor, the transmission, frame—all the chassis units.

But—the one factor that cannot ever be duplicated is **experience in designing and construction—of studying, analyzing and probing transportation needs** of every line of business.

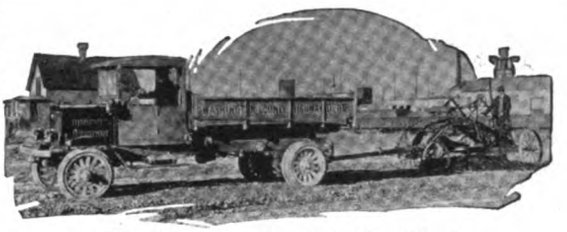
Kissel Trucks on America's "Bread Line"

Establishing Buying Confidence

Into every Kissel Truck fourteen years of experience are built, and as each year has passed, our confidence has grown and grown until Kissel Trucks have become **a product of confidence.**

"Old Iron Sides," a Kissel Truck that has Upheld Kissel Confidence for Over 250,000 Miles.

The real test of any truck is the time test—what a truck has done over a period of years you can continue to expect of it—because the manufacturer's reputation exacts it of him.



Kissel Truck on America's Good Roads Construction Program

Kissel reputation was built on a combination of dominating principles of construction put together with all the accuracy the best engineering skill is capable of, and embodying the ideals born of many years of truck building.

The result—the Kissel Truck of today is an evolution—a constant striving toward an ideal from which the Kissel reputation was born, to grow to the rank it has attained today.

We realized many years ago that getting transportation costs down was one thing—**and keeping them down another thing.**

Kissel Trucks owe their reputation for dominant performance and stability to not one particular feature, but rather to the **combination of practical mechanical features taught us by experience.**

Fundamental truck essentials are closely guarded by Kissel engineers throughout the chassis, giving that **certainty of performance** and **stability of operation** that create confidence.

Creating Permanent Confidence

Permanency is a by-product of confidence, because the manufacturer in building confidence must erect his structure on a permanent foundation. It was only by building the Kissel factories complete in themselves—of forming permanent financial connections—of perfecting an organization of trained men and skilled engineers that Kissel Trucks could merit the public's confidence—and to keep that confidence demands our expanding our facilities, equipment and labor. Sons work alongside of their fathers—each year sees more and more Kissel homes going up, to be handed down to the new generation that will uphold the Kissel confidence long after you and I have finished our work.

"Old Iron Sides" one of the first Kissel Trucks built is, after over **two hundred and fifty thousand miles, still giving uninterrupted service. True, it has had many changes—a new hood—cab—wheels—many tires and bodies—but the original motor—frame—axle—bearings, are** still good—proclaiming that confidence was built into Kissel Trucks **from the very first.**

How Confidence in Kissel Trucks has been Created

We have deliberately created buying confidence in Kissel Trucks and with equal deliberation and determination we are furthering this confidence through constant study and experiments.

Take the stability of the Kissel-built motor, designed, perfected and manufactured for truck power purposes only. A corresponding high degree in perfection is in the axles, massive frame, brakes, with a large factor of safety—heavy, flexible springs of especially selected steel—pressed steel frames built with practical reference to overloads. In Agricultural America, moving the bumper crops and keeping up the meat supply—in County and Municipal work—on America's mammoth good roads program—for manufacturers, wholesalers merchants—Kissel Trucks are creating more and more confidence.

Kissel Truck on America's "Firing Line"

Built in five sizes, from our "General Delivery" model for quick delivery, to the mammoth "Goliath" model, a giant in power and a brute for work.

Kissel Truck on America's Great Building Program

In addition, Kissel designing construction and easy accessibility of all parts, simplify any service work, while standardized parts and a wide distribution of service depots, assure low upkeep expense.

Further details with specifications and data on request from nearest Kissel dealer or Kissel Motor Car Co., Hartford, Wis

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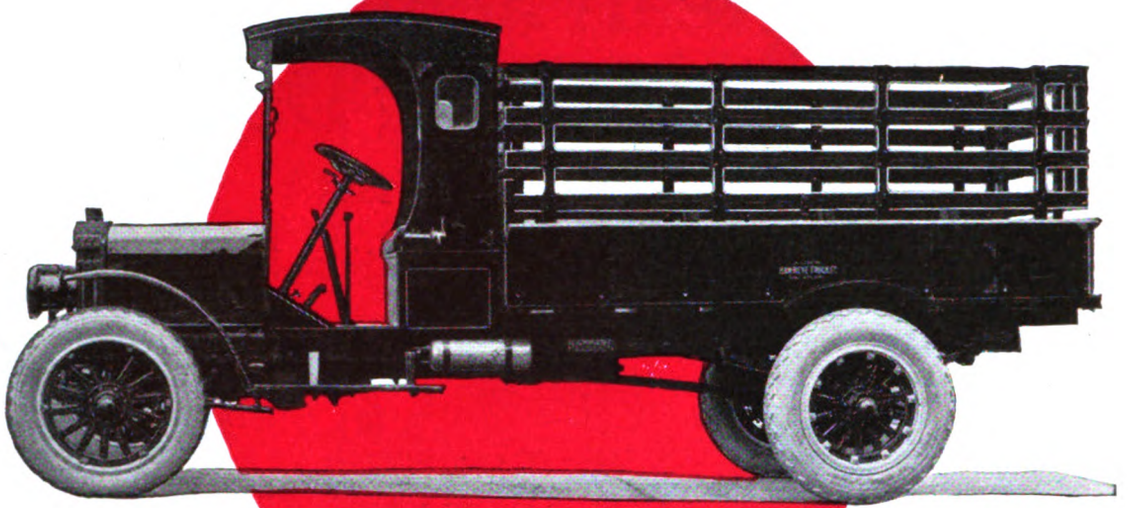

HAWKEYE
MOTOR TRUCKS

Motor trucks are bought for just one reason—because the motor truck is the most economical means of promiscuous transportation.

We say **promiscuous** transportation because steam and electric railroads operate on fixed, unchanging routes, while the motor truck should operate anywhere and everywhere.

Now if a motor truck is bought because of its economy and efficiency in promiscuous transportation, the user should not be required to operate that truck on certain well paved streets or well built roads—fixed routes. So doing, he **restricts his truck** to a **narrow right of way.** Hawkeye Trucks

Make Every Road a Right of Way

Hawkeye Trucks have more load carrying strength and greater load moving power. Hawkeye Trucks are built for work—**hard work**—in mud, in snow, in sand, on hills and under every adverse condition of road and load that may confront them.

Isn't this the kind of truck you want to sell? Write for complete details.

HAWKEYE TRUCK COMPANY

R. A. BENNETT, President

638 Sixth Street **Sioux City, Iowa**

If you need trade catalogues use postal cards located in back of "Reference Book."

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MARTIN
CUSHION WHEELS
for Motor Trucks

No bolts
No nuts
Pressed on
Throughout
Light
Strong
Resilient
Durable

Backed
by
Nine Years'
Experience
in Building
Good
Cushion
Wheels

Adopted for Standard Equipment on
"OLD RELIABLE" MOTOR TRUCKS
1½ to 7 Ton

MARTIN CUSHION WHEEL CO.
311-13 N. Sangamon St. **CHICAGO, ILLINOIS**

Branches and Service Stations in All Principal Cities

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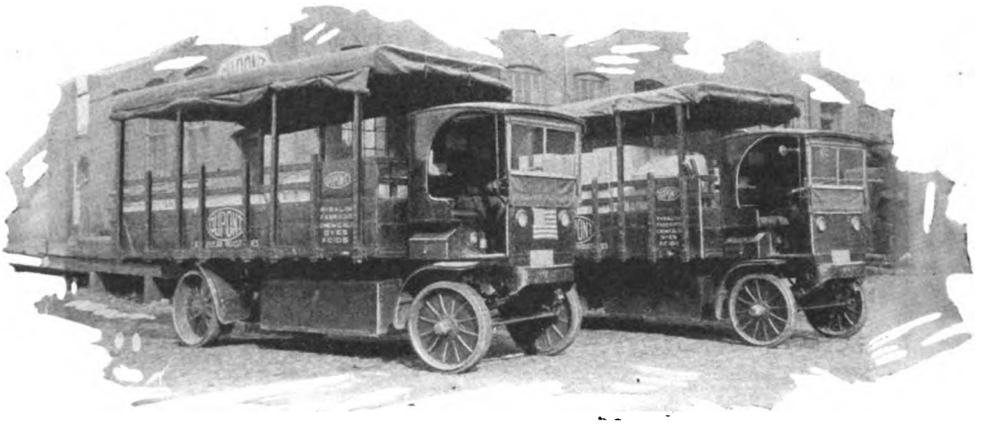
THE ELECTRIC STORAGE BATTERY CO.



SOLVE YOUR TRANSPORTATION PROBLEMS

The Electric Truck equipped with the "Ironclad-Exide" Battery will give you long, dependable service. For short hauls and congested city traffic it will show greater economy and less depreciation than any other form of transportation.

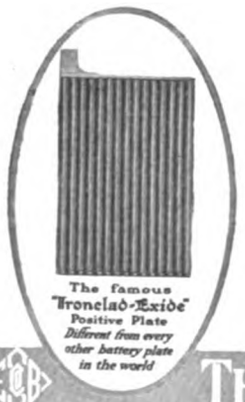
Thousands of electric trucks throughout the United States are equipped with

The "Ironclad-Exide" Battery

(Unlike Any Other Battery in the World)

It has shown conclusively its all-round superiority by its economy of operation, reliability of performance and capacity for strenuous work.

The Electric Vehicle Department of our nearest office will be glad to give you facts and figures that will help you solve your battery problems.



THE ELECTRIC STORAGE BATTERY CO.

The largest manufacturer of Storage Batteries in the world

1888 PHILADELPHIA, PA. 1920

New York Boston Chicago Denver San Francisco St. Louis Cleveland Detroit Washington Minneapolis Kansas City Atlanta Pittsburgh Rochester

Special Canadian Representatives: Chas. E. Goad Engineering Co., Ltd., Toronto, Montreal

Batteries are made by this Company for every storage battery purpose

THE ELECTRIC STORAGE BATTERY CO.

Please mention "Power Wagon" when writing to advertisers

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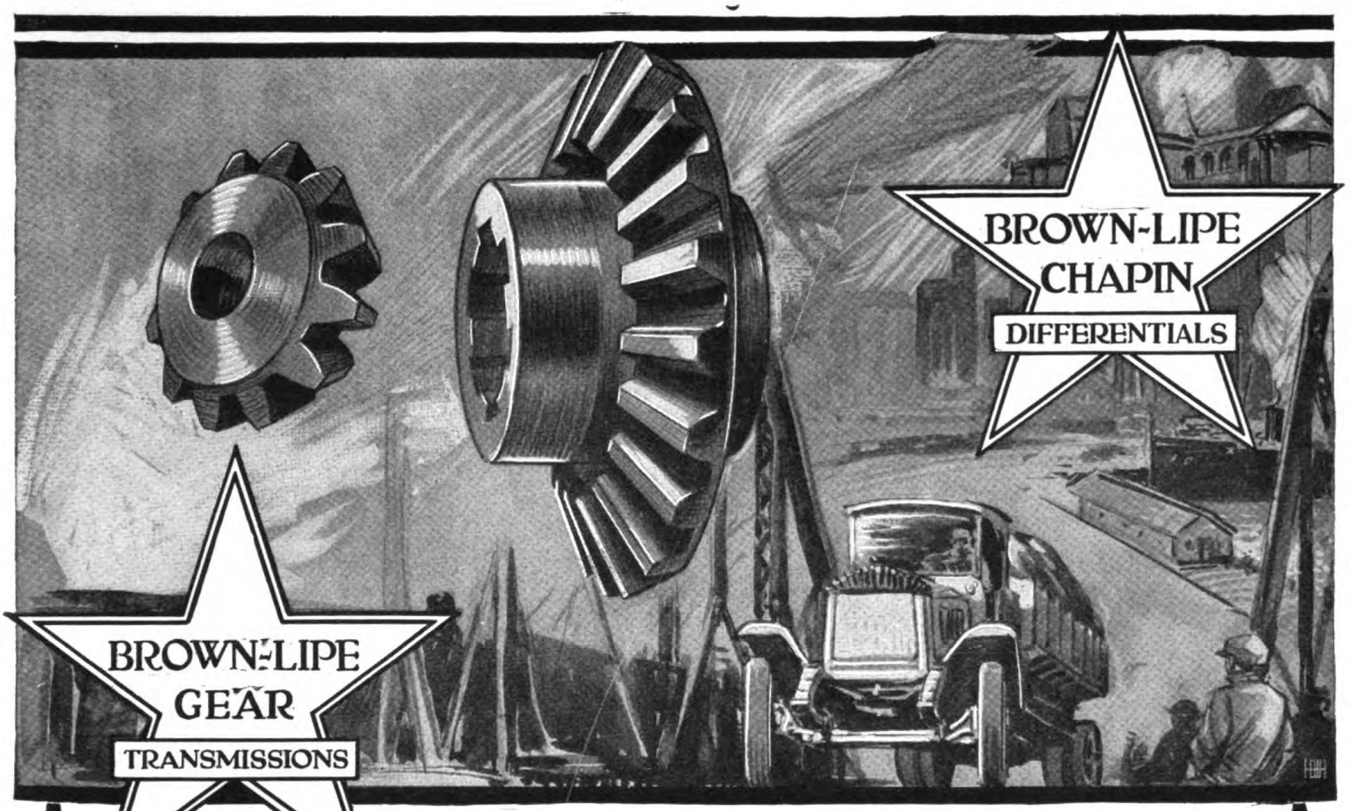

Rough, Heavy Trucking
Requires Fine Workmanship Even to Small Parts

A truck-owner expects his transmission and differential to do the heaviest work he can put upon it, and to keep on giving dependable service. He has no desire to take out a differential or even look inside the transmission case.

A mechanism to meet these expectations must have the perfection of a fine watch, combined with the strength of a giant.

The differential bevel gears illustrated here are made with these requirements always in mind. As essential parts of the differential, they receive most careful attention in every step of production.

It is such accuracy and strength that have helped to build Brown-Lipe reputation for quality.

BROWN-LIPE-CHAPIN CO.
DIFFERENTIALS

BROWN-LIPE GEAR CO.
TRANSMISSIONS

Both at **SYRACUSE, N. Y.**

Export Agents BENJAMIN WHITTAKER Ltd., 56 Ludgate Hill, London, E. C. 4.

No. 3 of 40 Reasons for Superiority

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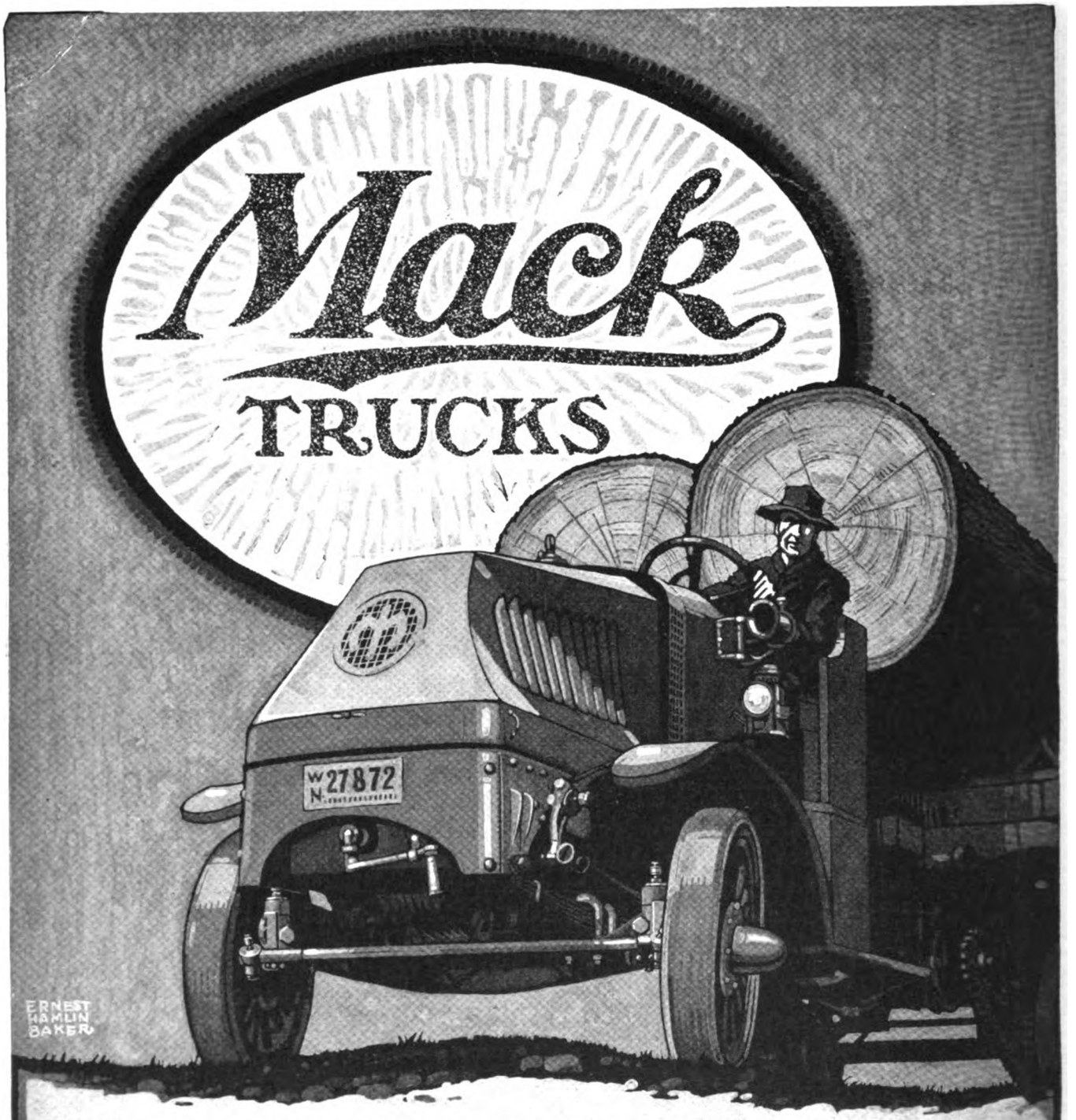

"PERFORMANCE COUNTS"

Power and strength! These two qualities of MACK Trucks impress themselves on all observers. They are the outward indications of that inward perfection of design and manufacture that keep MACK Trucks constantly on the job. Bodies for all kinds of service and special loading and unloading appliances, too.

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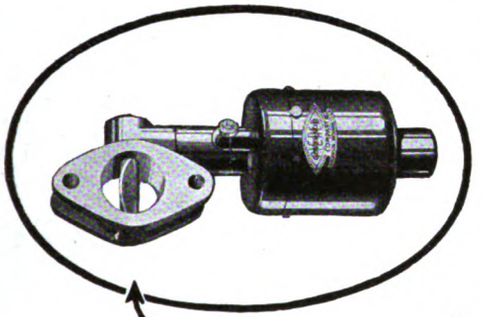
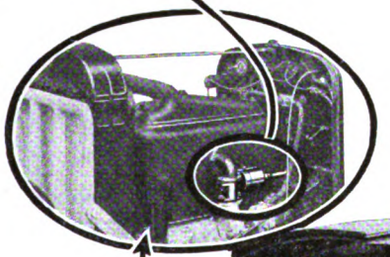
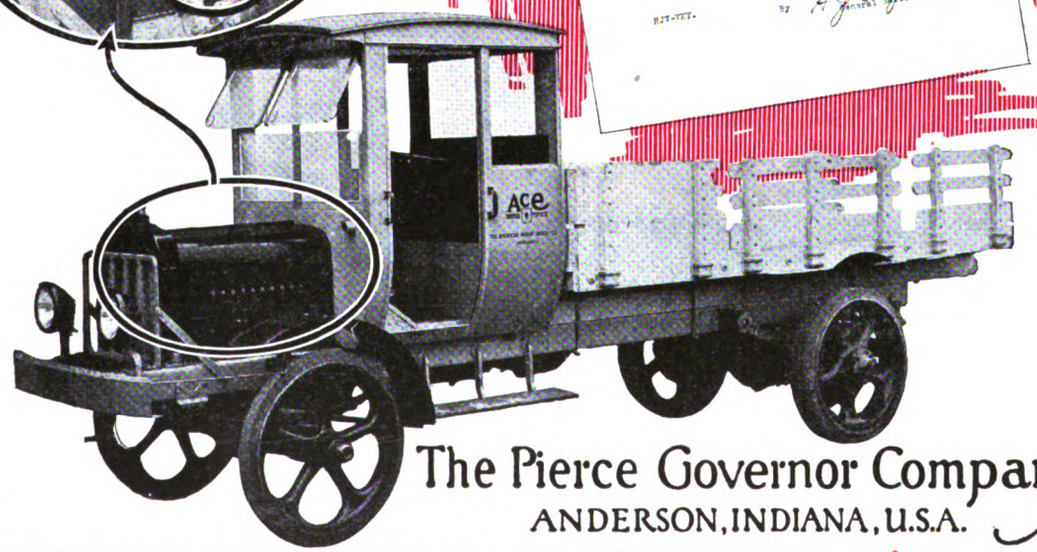
PIERCE Governors

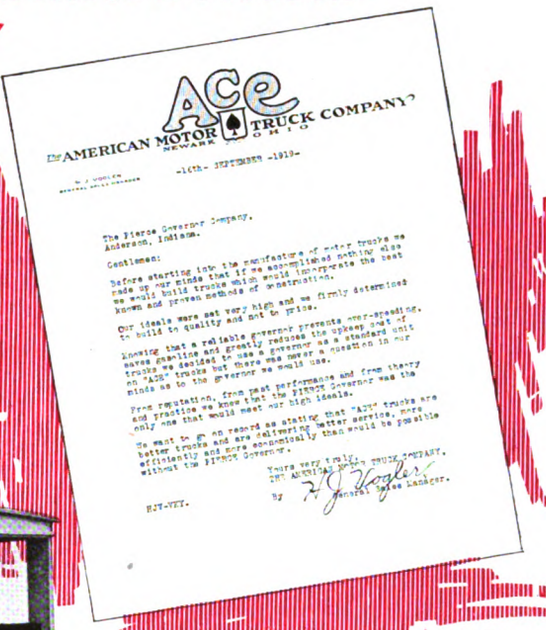
Standard Equipment on Ninety-Nine of the Best Makes of Motor Trucks—

-and here's the reason why









The Pierce Governor Company
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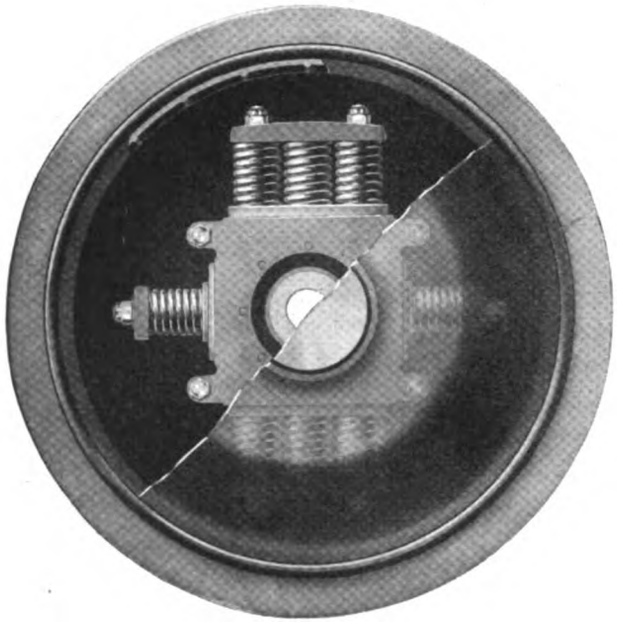
You Double the Life of Your Truck
When You Stop the Effects of Road Shocks



Springs always remain in this position. They do not revolve with wheel. This insures constant even suspension of load and the elimination of vibration. The Cornfield Wheel is practically indestructible.

Vibration from road shocks is the greatest enemy of the motor truck. It affects the motor, it loosens the frame, it causes greater wear on every working part.

Vibration is the direct result of road shocks. The shock effect of every obstruction on the roadway is carried immediately to the axles. transmission and motor.

Rubber tires overcome a part of the shock. but the tires themselves suffer more from the violent pounding than from natural road abrasion.

The greatest protection known to Automotive engineers for the entire truck is the

Cornfield Resilient Wheel

Pneumatic Results—and More—With Solid Tires

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Tires on Cornfield Resilient Wheels that have run 3,500 miles show no effects from the constant pounding on uneven pavements, even when trucks are constantly overloaded.

You need Cornfield Resilient Wheels on your motor trucks.
They will keep your truck out of the repair shop.

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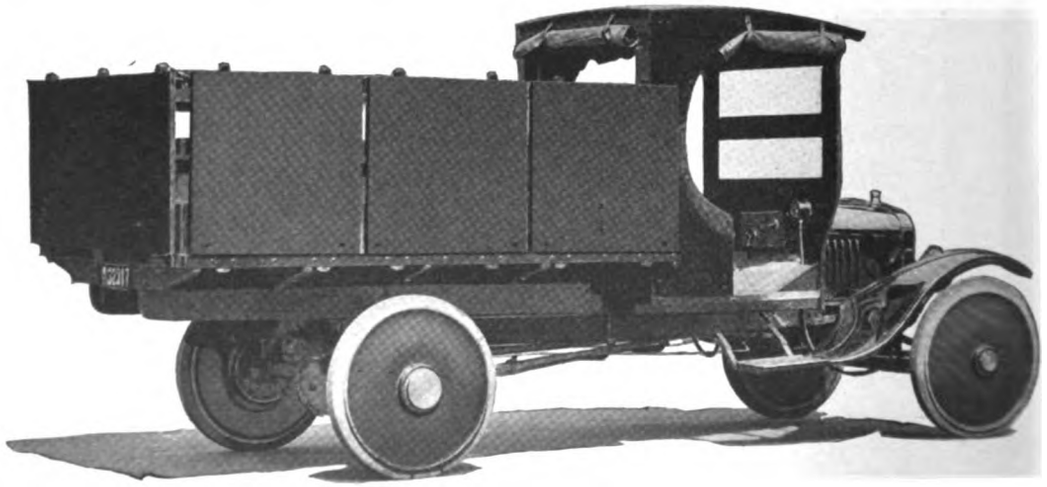

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"Champion" Lamps have a fine optical lens and the oil pot lifts in and out of the base through the doorway so that it cannot be lost on the road.

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CARTER BUILDING, ROCHESTER, N. Y.

DIETZ "CHAMPION" MOTOR TRUCK LAMPS

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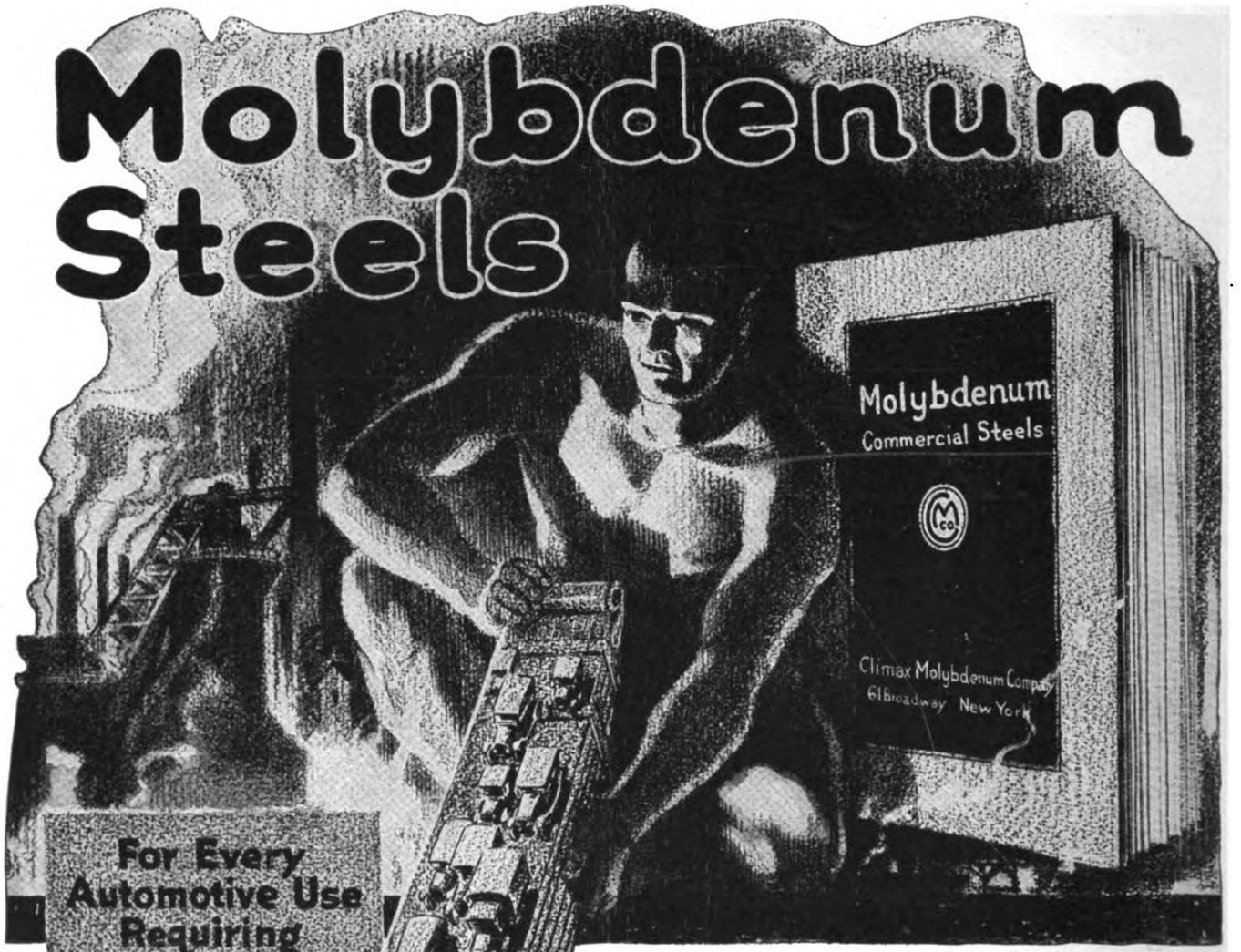

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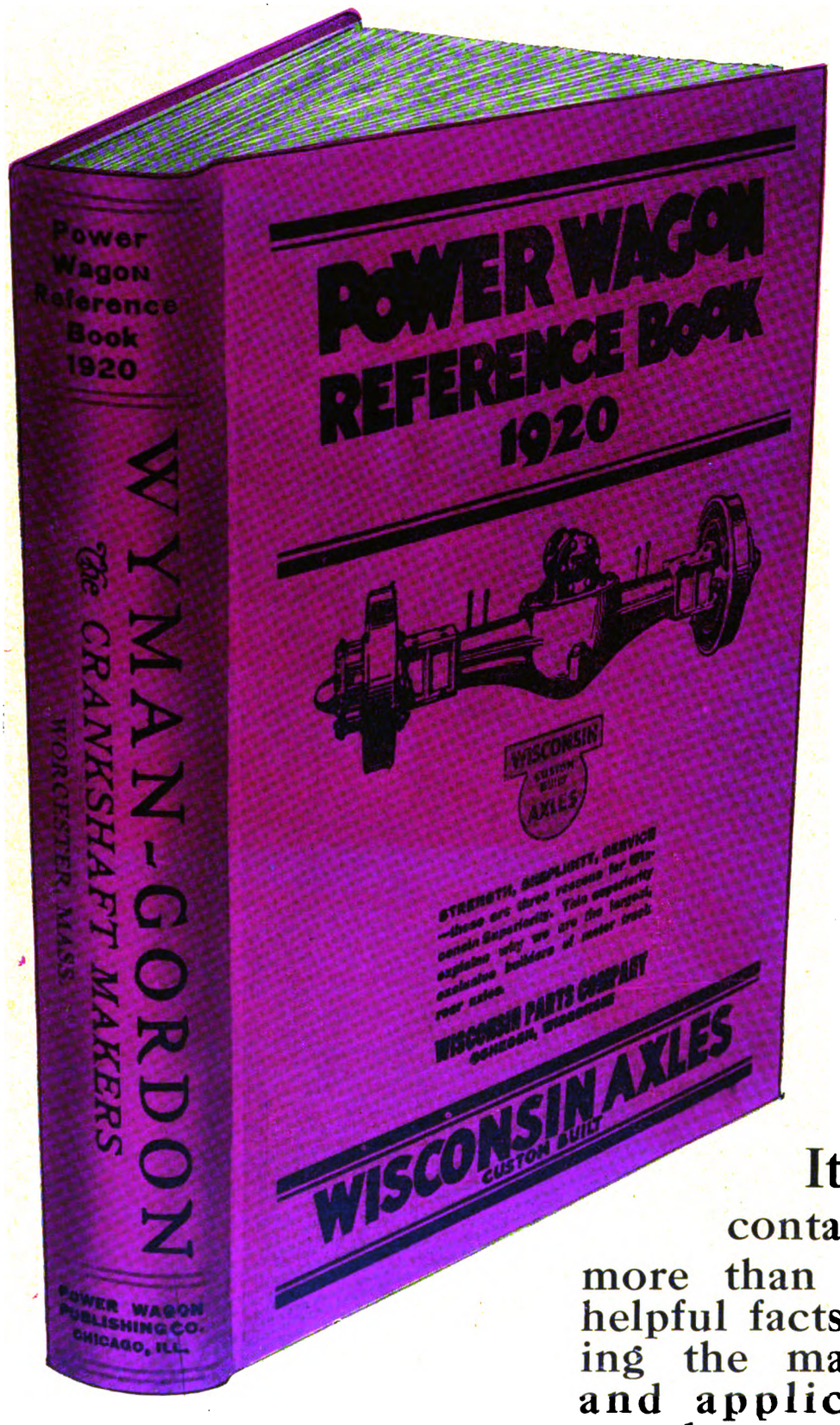

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A brief survey of its contents

Specifications

"Reference Book" Specifications are not limited to a statement of the makes of the various parts used in the construction of Motor Trucks, Farm Tractors and Trailers. They include dimensions of all kinds—detailed technical descriptions of the parts themselves. The 125,000 separate facts contained in these tables are so conveniently arranged that it is unnecessary to turn the book in order to read the various column headings. Everything can be seen at a glance—a helpful feature that is to be found **only** in the "Reference Book."

Blue Prints

The book contains 156 pages of blue prints printed in color. Every drawing was prepared with great care and at heavy cost by our technical department from prints and original data secured from the manufacturers. These prints cannot be found in any other publication. They afford the reader an accurate and true view of design and construction, and illustrate many important features of the machines displayed that could not be shown as well by any other means. The blue print section will be of great value to dealers and manufacturers.

Motor Trucks

There are 582 different models of motor trucks on the market. The "Reference Book" contains the most complete and the most detailed set of motor truck specifications ever printed. These cover every important feature of design and construction. The tables include information of great importance to everyone connected with the industry and they cannot be found so well presented in anu other publication.

113 full page blue prints of the principal trucks on the market are printed in color—an exclusive feature and the most vivid exposition of the product of the manufacturers ever presented to the trade.

The 103 pages describing the operation of motor trucks in the principal lines of trade offer an intensely interesting and highly instructive feature for the individual who needs facts on Transportation costs and problems. These studies of operation—prepared at great cost—contain the vital facts about the economy of the machine—and coupled with each study are tables illustrating the extent of motor truck application in each important field. This latter information is tabulated by states, and by the sizes of machines employed. To the sales executive these tables represent an authoritative guide to market. They explain market development and illustrate the future possibilities. The progressive, thinking man will find these tables worth a great many times the cost of the entire book.

Bodies

Did you know that there are over 100 different types of motor truck bodies?

The Body Section of the "Reference Book" is the most complete and the most detailed exposition of the types on the market ever presented. You will find illustrations of practically every type, from the simple platform body to the complicated combination elevating and dumping body. The truck chassis dimensions are given in the greatest detail and printed in the most convenient form. The dealer and the manufacturer alike will find continuous profit in the use of this section. It will help **you sell trucks.**

Trailers

Did you know that there are 432 different models of Trailers on the market?

You cannot afford to be without full information concerning this big industry. How and where are all these Trailers used? Is money to be made selling them or manufacturing them? Can the sure profit through their use, and just what are the facts about the economical application of Trailers? The "Reference Book" will give you the facts—the specifications and 20 pages of blue prints of the principal models.

Farm Tractors

Can the motor truck dealer sell tractors and make money? The "Reference Book" presents a clear cut view of this industry. It prints lists of the manufacturers and what they make—the specifications of all models and about 20 pages of blue prints

The dealer will get a first hand study of power farming—of how the Tractor is applied—how it has increased the farmer's efficiency and reduced his cost

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The POWER WAGON REFERENCE BOOK is the most useful publication printed for the industry.

of production—it even goes further—it explains the many other uses of the tractor, and unfolds the great sales possibilities that this field offers the automotive dealer. Do you guess—or will you get the facts from the "Reference Book"?

Electric Trucks

What are the developments, the economies, and the future of this type of machine?

The largest individual user of electric trucks in America tells what electric trucks have done in his organization, and presents some interesting facts never before published. The Electric Truck Section contains specifications of all models on the market, blue prints, and the most thorough article on their application ever printed.

Passenger Cars

For the convenience of dealers interested in Passenger Cars, the lists of vehicle and parts manufacturers, and the specifications of the various machines on the market, are presented in the most convenient form.

Parts

Over 700 concerns make parts for the manufacturers of the finished trucks, trailers and tractors. Who are these concerns and what do they make? The "Reference Book" not only describes the important parts that go into the finished vehicles, but it tells you something about the organizations that make them—the number of employees—the size of the plant—the length of time in business, etc. In other words, you get a concrete idea of the vast manufacturing resources of the industry. This information at times will prove a powerful sales help, and a useful guide to the purchase of material.

Facts and Figures

How much has production of Motor Trucks increased by years since 1904?

The "Reference Book" contains facts and figures on production, distribution, weights and dimensions of commodities hauled—in fact it presents reliable data on every important phase of the construction, design, application and sale of the product of the industry. It is the indispensable handbook of the progressive element of the trade.

HOW YOU CAN GET IT

The "Reference Book" is sold only in conjunction with a yearly subscription to the "Power Wagon," the industry's oldest and most progressvie trade journal. Each month, beginning with the April issue, the "Power Wagon" will print the latest specifications of all motor trucks. From time to time throughout the year special issues will be published in which the latest developments are accurately recorded. You will learn about the newest types of bodies offered to the trade—be informed on the latest developments in the trailer field, to say nothing about our continuous efforts to present all the new developments in motor truck design, as well as better methods of sale. The combination offers you the only service of its kind in existence. The combination will save you money because the facts will always be at your fingers' ends.

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1920

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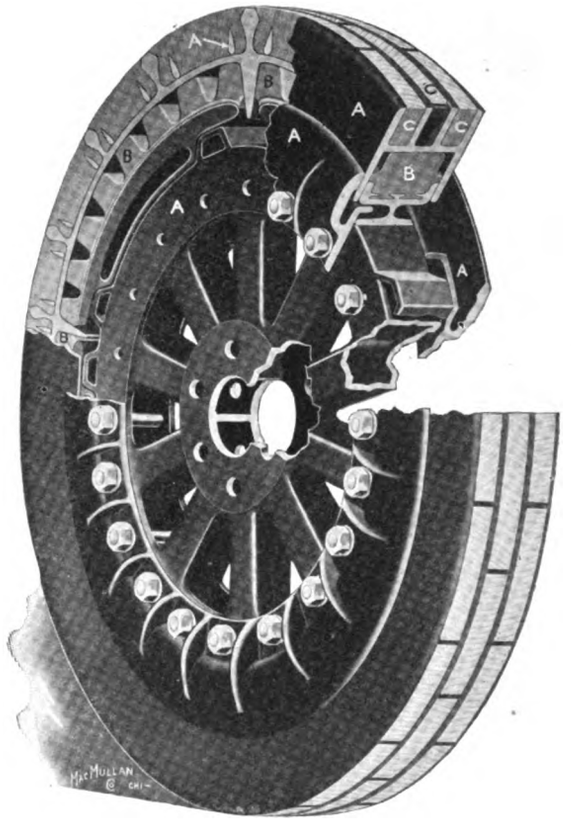

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This Wheel Excels in Resiliency, Efficiency, Durability and Economy.

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A Practical Wheel for Any Truck on Any Road with Any Load

This Wheel Meets the Growing Demand of Truck Users for Reducing Upkeep, and for Protection from Engine, Tire and Chassis Troubles.

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1½ and 2½ tons

The Victor worm drive motor truck is designed to stand rough usage and to give long and continuous service. That it is doing this is evidenced by repeat orders and its large number of satisfied users.

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Victor Truck Company

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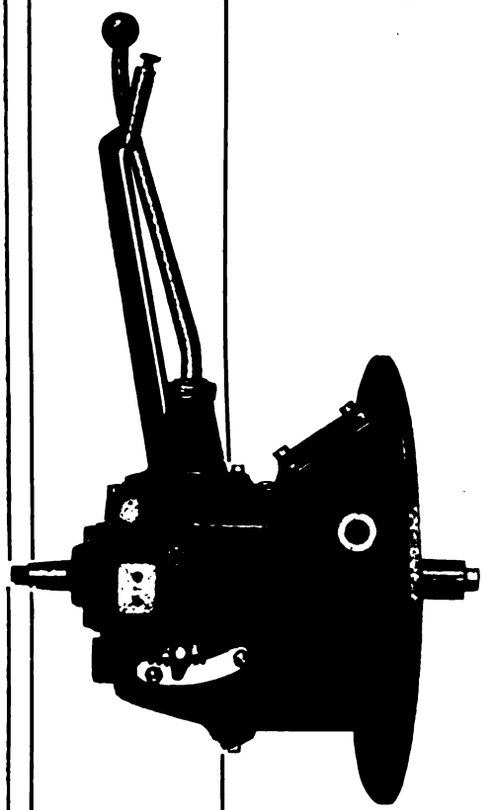
Standard Designs for Trucks Up to 2½-Tons Capacity



STEWART, who takes pride in the slogan "No Stewart Truck Has Ever Worn Out," selects Durston Transmissions for lasting reliability.

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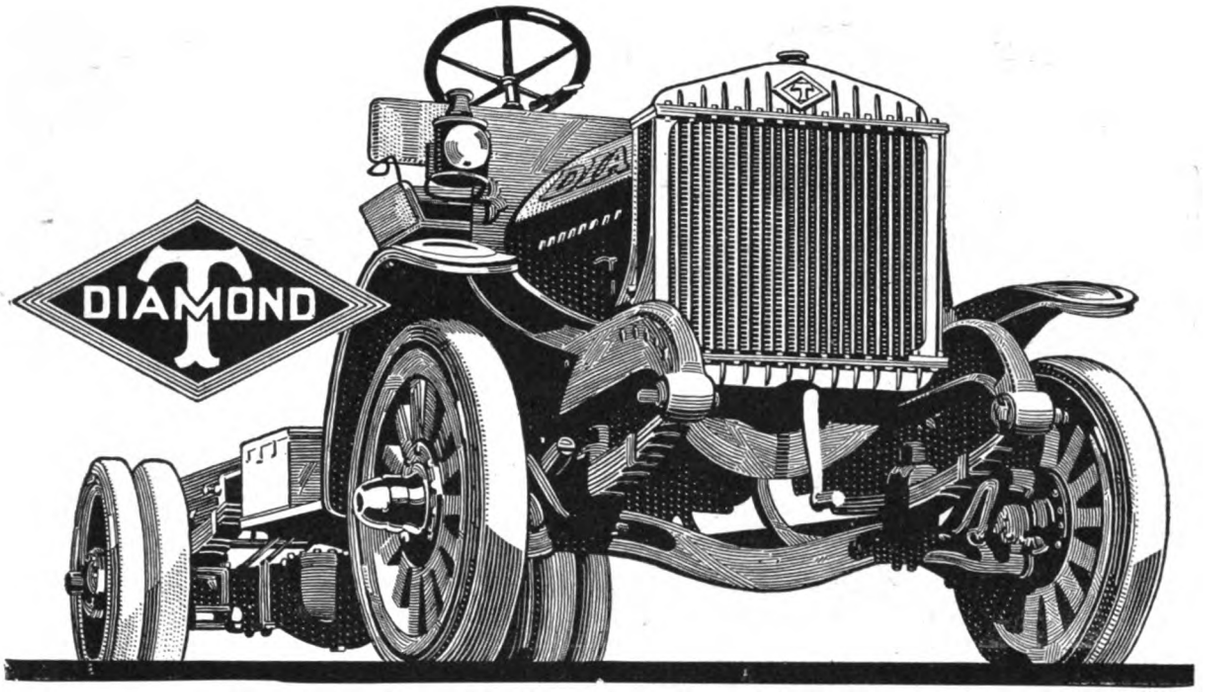

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The gasoline transport of steel, stone, coal, brick, lumber is the task that tries truck mettle. Contractors and transfer-men find Diamond T's mighty dependable material movers. Here, for instance, are two testimonies fresh from our files that are typical of similar evidence reaching us every day.

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I have run this truck over 15,000 miles in the past 15 months without a penny of expense for repairs of any kind and although I have kept no records on cost per ton mile I know in a general way that this has been considerably below the average.—A. G. White, Gary, Ind.

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More than 180 lines of business employ Highway Trailers.

There is a type for any need.

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1½ TON Capacity	2½ TON Capacity	4 TON Capacity	6 TON Capacity
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HIGHWAY TRAILER

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MOTOR TRUCKS

PRE-EMINENTLY America's quality heavy duty truck with a seven-year record of consistent day-in and day-out performance.

Made of the finest materials obtainable, such as nickel steel frame and silicon manganese steel springs. A special feature is the Hurlburt Hindley gear, which has a higher efficiency, longer life, and greater engaged tooth area of any gear on the market.

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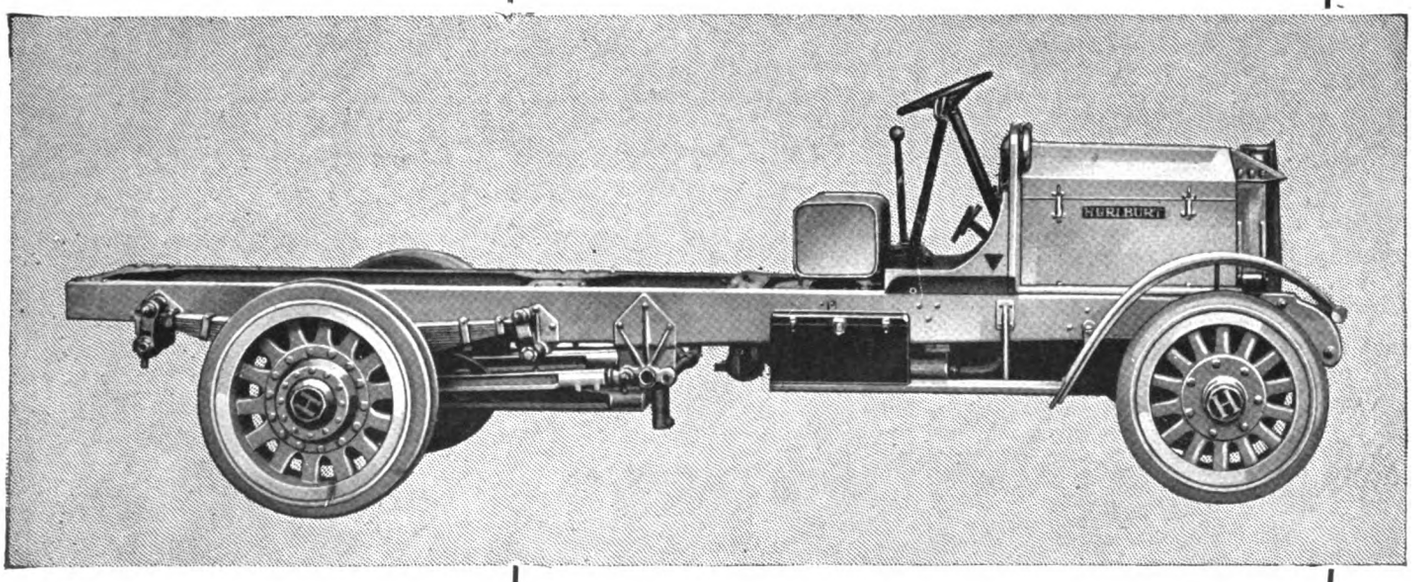

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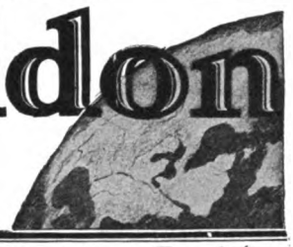
THE SATURDAY EVENING POST January 10, 1920

Sheldon Axle for Motor Trucks



The Long Leverage Principle is Employed to Carry the Freight Tonnage of the World

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It is a "live," load-carrying, revolving axle, with the wheels fixed to the axle, and the whole revolving as a unit.

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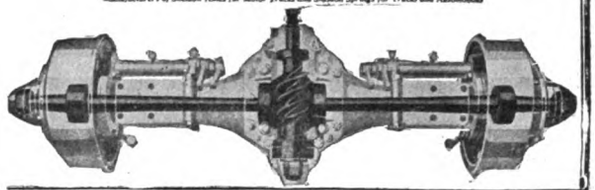
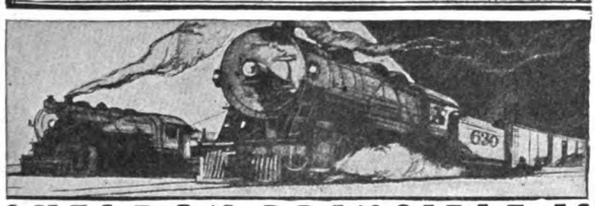
Manufacturers of Sheldon Axles for Motor Trucks and Sheldon Springs for Trucks and Automobiles





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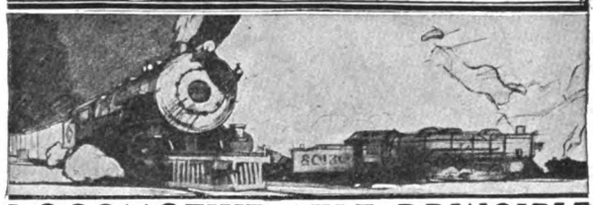

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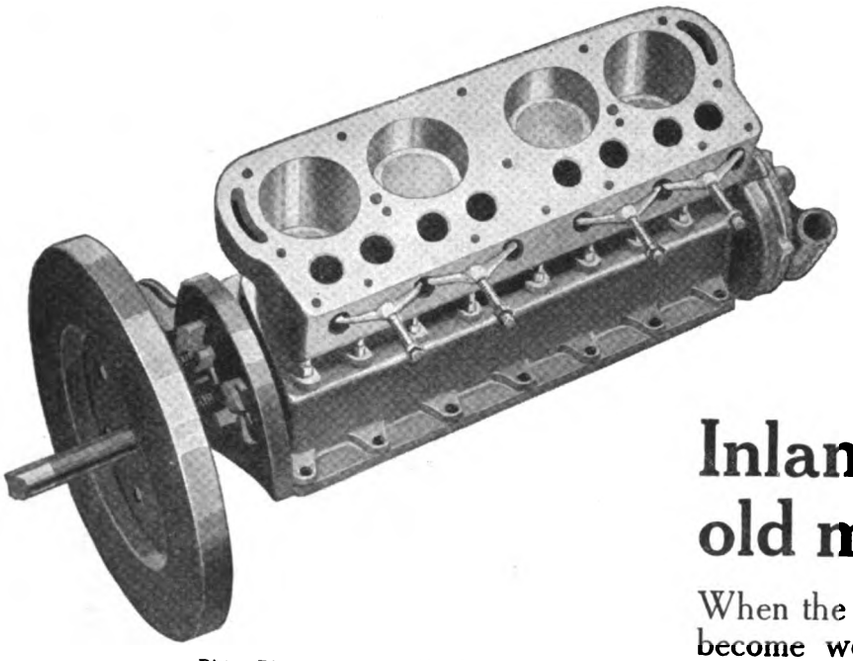

Inlands make old motors *new*

When the cylinders of your engine become worn and "out of round" —it is then you most need Inland Piston Rings.

For Inlands readily adapt themselves to the variations of the cylinder walls.

The Inland is the only piston ring with a spiral cut. It uncoils and contracts like a spring—maintaining a snug, tight contact against the walls of the cylinder.

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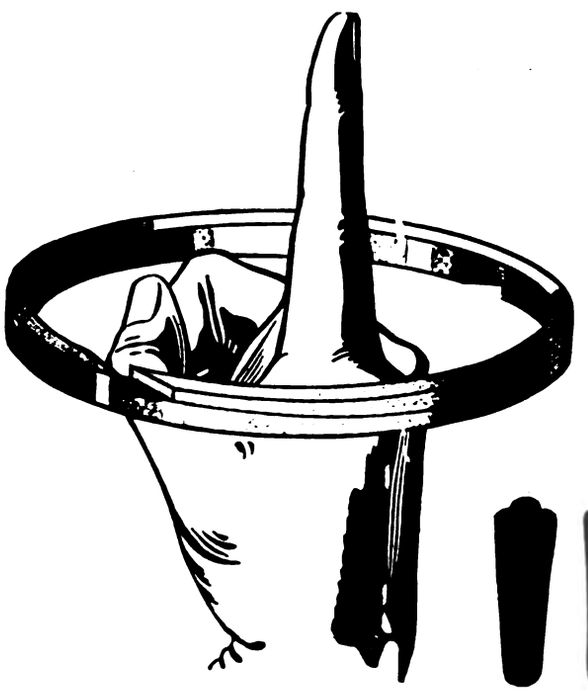
Piston Rings must be capable of expansion in order to fit snugly against the cylinder walls. For, cylinders vary considerably in diameter, even in the same engine.

This expansion is provided for in the Inland Piston Ring by the spiral cut. It always fits tightly because it uncoils like a spring.



Samples on request, to dealers, importers, wholesalers and manufacturers.

Inland Machine Works
1650 Locust St. St. Louis, Mo.

INLAND
ONE-PIECE PISTON RING

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The Bethlehem Delivery Boy

Speed, Endurance and Economy. These three qualities reach their highest development in this newest Bethlehem Motor Truck.

The Bethlehem Delivery Boy completes a line of trucks which enables a dealer to cover his field with greatest profit. Is your territory open?

BETHLEHEM MOTORS CORPORATION

ALLENTOWN - - - - PA.

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SAVAGE AXLES

Do not require jacking the truck for renewing parts.

ALL moving parts are readily accessible, simple and inexpensive, though lasting in service.

The driver on the road knows the advantage of being able to renew any part of his differential or live axles without lifting up the truck or dismantling the wheels.

SAVAGE ARMS CORPORATION
SHARON, PA.
UTICA NEW YORK DETROIT PHILADELPHIA

SAVAGE

Please mention "Power Wagon" when writing to advertisers.

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EVERY day the great American fleet of **International Motor Trucks** threads over city street and country road, unraveling nearly 2,000,000 dependable miles from the limitless fabric that is **International Service.**

INTERNATIONAL Motor Truck haulage has developed into a powerful factor in the efficient conduct of nearly 200 lines of business, because of the traditions of worth and reliability treasured by the International Harvester Company.

For eighty-nine years this Company has been gaining in skill, guarding and never lowering standards, while manufacturing high-grade machines. For fifteen years it has been expending skill and experience in building engines for heavy-duty service. The trucks it offers are International-designed and International-built.

Wherever you see an International at work (recognize it by its distinctive sloping hood) you may learn a chapter in International truck success. One concern alone today has over 1,800 International trucks in its service. Fleet owners analyzed and compared and knew the facts, you may be sure, before they invested in **International Motor Trucks** as the best solution of their transportation problems.

International sizes range from ¾-ton to 3½-ton. Whatever the requirements, these trucks and International Service are fitted to fill the bill. The future for International truck and dealer is one of undoubted success.

Motor Truck Department

INTERNATIONAL HARVESTER COMPANY

of America

(Incorporated)

CHICAGO **U S A**

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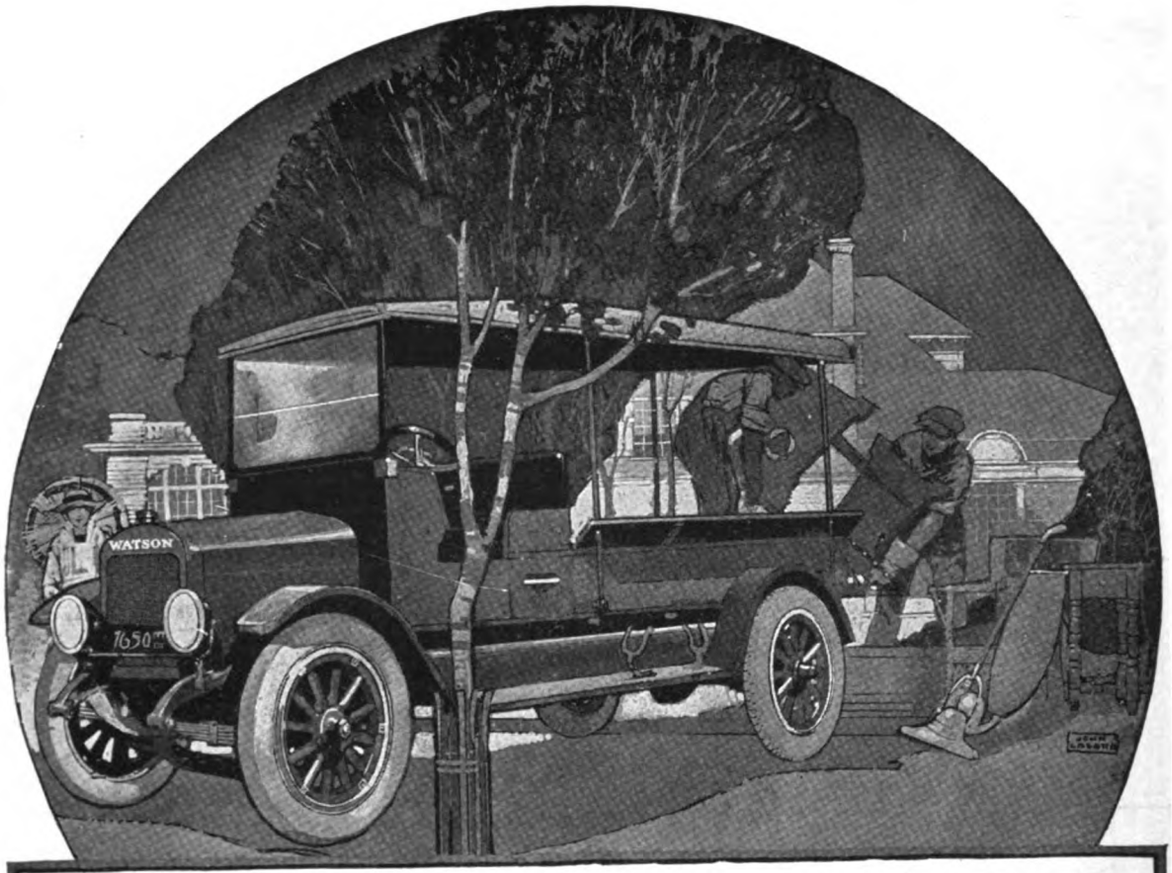

WATSON TRUCKS

RUGGED STRENGTH

Anyone, anywhere on the face of the globe, who knows Watson hauling equipment will unhesitatingly say that Quality and Rugged Strength have been consistent characteristics of Watson products throughout the 31 years of Watson history.

The same reputation that attaches to the Watson Road Tractors, Trailers and Dumping Wagons is now accredited the line of Watson Motor Trucks.

Built by a concern with 31 years of success behind it and offering a complete line of haulage equipment, soon to be aggressively advertised, the Watson contract holds many sound advantages for the dealer who aims to build business permanently.

Write for full particulars.

Watson Products Corporation, Canastota, N. Y.
Main Office and Plant, Canastota, N. Y.

WATSON MODEL B

For all light, quick hauling

Motor, 4-cylinder, 3½" x 5½"
Speed, 30 miles an hour
Worm gear drive
Wheelbase, 128 inches
Starting and lighting system
Tires, 34" x 4½" pneumatic, non-skid rear
Extra long springs
¾-1 ton, with reserve capacity that practically eliminates evils of overloading and meets severest conditions of road and grade. Rugged, durable, dependable—for uninterrupted, long-time service.

WATSON
HAULAGE SYSTEMS
MOTOR TRUCKS
ROAD TRACTORS
DUMPING WAGONS
& TRAILERS
WATSON PRODUCTS CORPORATION CANASTOTA N.Y.

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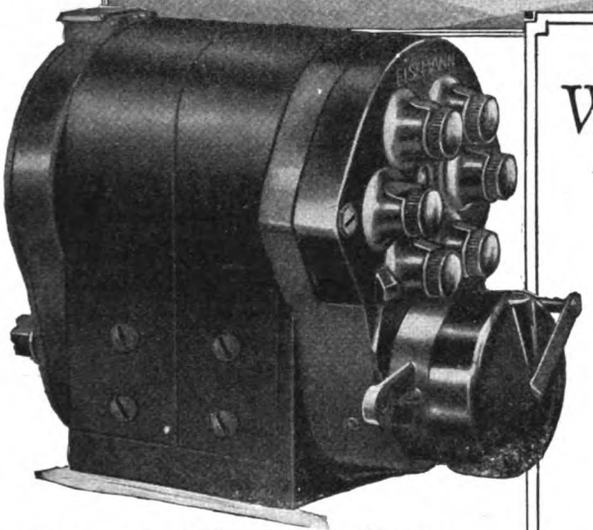
EISEMANN MAGNETO

for Dependability

American La-France Fire-Engine equipped with Eisemann GN6



Note the obviously sturdy construction and rugged power. The performance of the Eisemann fully bears out this impression.

When the Alarm Sounds

—there must be no hesitation or faltering. A quick getaway is vitally essential!

The Eisemann equipped Fire Engine responds instantly to the alarm. A powerful, hot, lingering spark is always there when needed.

For dependability under all conditions and easy starting in all temperatures, the Eisemann Magneto represents the perfection of the Science of Ignition.

THE EISEMANN MAGNETO CORPORATION

Makers of Magnetos for All Types of Electrically-Ignited Internal Combustion Engines

Plant and General Offices—32 Thirty-Third St., Brooklyn, N. Y.

CHICAGO—1469 S. Michigan Avenue
DETROIT—85 Willis Avenue, West

LONDON, ENG., Stanley J. Watson, 37 Sheen Road, Richmond

At low speed or high speed—
the Eisemann delivers the same hot, steady spark which means complete combustion and maximum power, even with low grade fuel.

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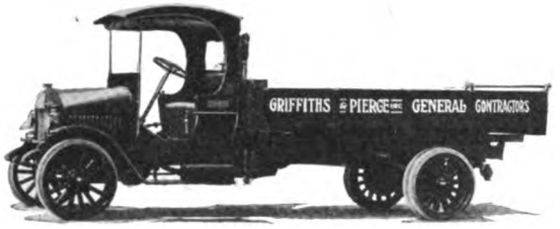
400 x 50 = ?

CAN YOU FIGURE IT OUT?



Rainier

WORM DRIVE Delivery Trucks

¾ TON—$1750
1 TON—$1875
1½ TON—$1975
2 TON—$2400

Four Hundred Times Fifty

THAT equals your profit on 50 trucks for the year at $400—(just for the sake of making a point).

But when 10 or 20 or 30 of these trucks come back a dozen times during the year for replacements—

What *does* happen to your profit of 400 x 50?

A truck must stay on the road to make money—for the man who sells the truck as well as for the man who buys it.

—To do that a truck must be made of the kind of units that mean service.

—To do that a truck must be constructed with the kind of engineering skill that makes a truck a piece of real machinery designed for efficient automotive transportation.

You men who know trucks—read the Rainier specifications. They tell their own story. And ask the happy dealer who sells Rainiers what kind of service is rendered by this "Little Brother to the $5,000 Truck."

That will give you the plain *facts* about the Rainier, unpolished by words of argument.

We will gladly send you details of our liberal contract terms—if you are a live-wire and can demonstrate your ability to sell a truck that shows a real profit. Write—

Rainier Motor Corporat on
SALES DEPARTMENT
225 West 58th Street, New York
Factory—Flushing, Long Island, New York

SPECIFICATIONS

MOTOR—Continental Red Seal in all models

CLUTCH—Brown-Lipe multiple disc

SPRING CONSTRUCTION—Patented double safety shackle on front end of rear springs

TRANSMISSION — Brown-Lipe

REAR AXLE—Timken and Sheldon worm and gear

CARBURETOR—Zenith, with Stewart Vacuum system and Monarch Governor

IGNITION—Simms or Bosch Magneto

WHEELBASE—¾ Ton 125"; 1½ Ton 133"; 2 Ton 147"

LOADING SPACE—¾ Ton 90"; 1½ Ton 9' to 10'; 2 Ton 11' to 12'

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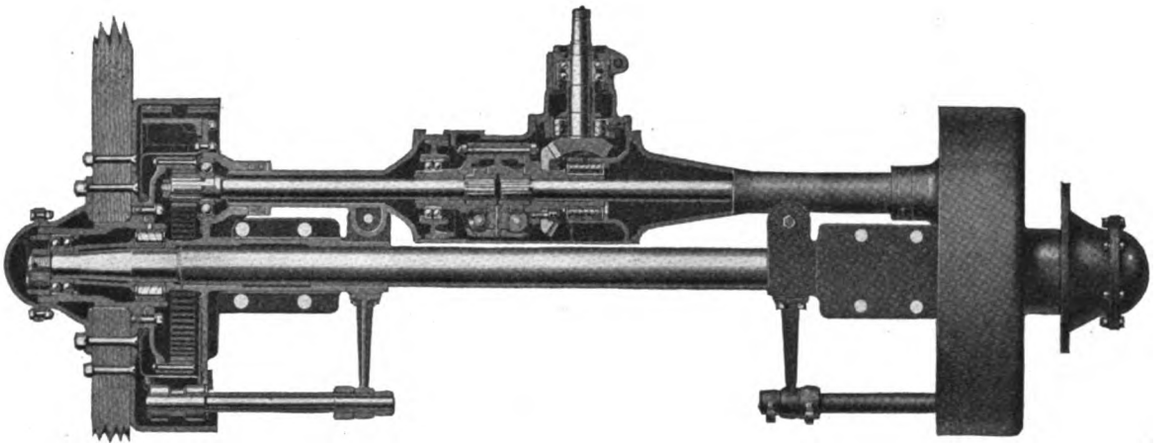
KENNEDY AXLES

for high grade motor trucks



Torque Absorption Feature

Kennedy Axles, by means of heavy coiled springs, protect every vital part of the truck from shocks due to changes in torque, thus *decreasing the cost* of wear and tear on engine, differential and tires, and *increasing the life* of the truck.

1½ ton 2½ ton 3½ ton

The Hero Manufacturing Company

2347 Westmoreland Street

PHILADELPHIA, PA., U. S. A.

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NEW DEPARTURE

Full Speed Ahead!

Greater production is the big need to-day.

Speed up your machines. New Departure Ball Bearings allow you to drive your machines at higher speeds with the same power. This means increased production and decreased manufacturing costs.

Install New Departures and get full speed ahead!

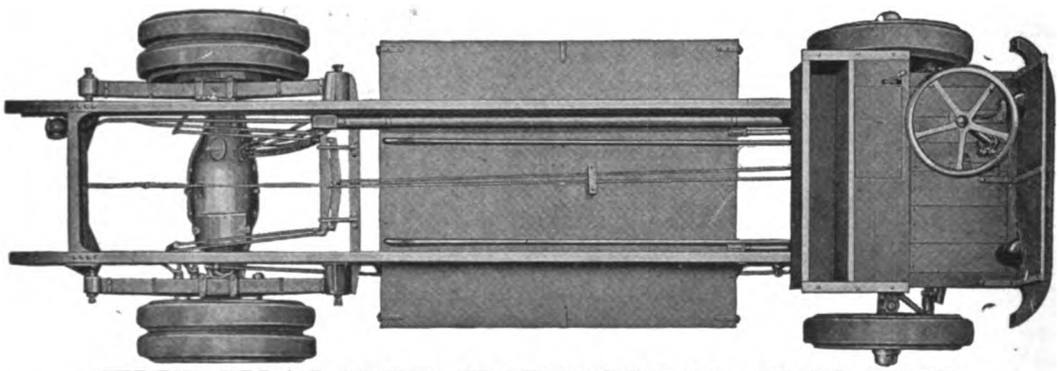
THE NEW DEPARTURE MFG. COMPANY,
Chicago BRISTOL, CONN. Detroit

Conrad Patent Licensee.

Our engineering department is at your command. Recommendations as to proper sizes and types of bearings needed are impartial and comprehensive.

493

WALKER ELECTRIC TRUCKS



THE WALKER IMPROVED CHASSIS

THE UTMOST IN *SIMPLICITY*—ONE THOUSAND FEWER PARTS THAN ANY GASOLINE CHASSIS. WALKER ELECTRIC CHASSIS ARE OPERATING *PROFITABLY* IN ALL INDUSTRIES.

ASK ANY WALKER USER, BRANCH OR DEALER

WALKER VEHICLE COMPANY

America's Leading Manufacturer of Electric Trucks and Tractors

NEW YORK CHICAGO BOSTON

LOWEST-TRUCKING-COST

Please mention "Power Wagon" when writing to advertisers.

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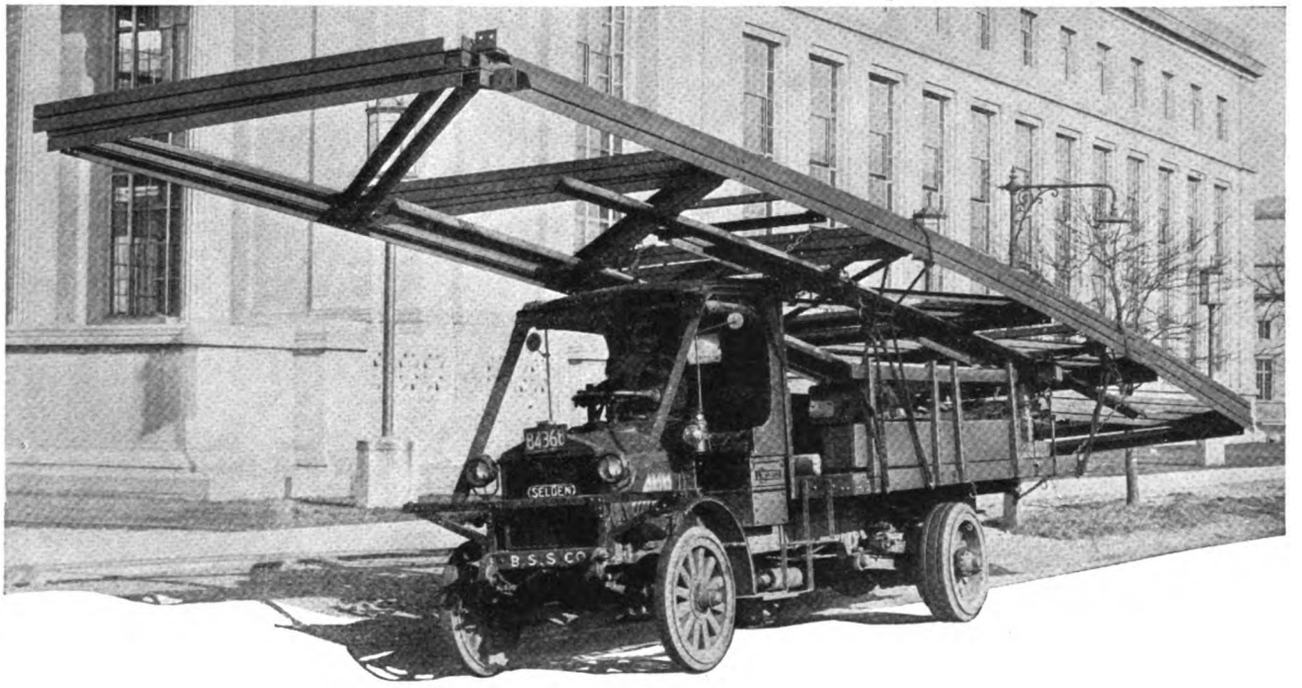

Advantages of the HIGH QUALITY of Selden Trucks

DEALERS who handle Selden Trucks are building worth while reputations for their organizations. And they are making a margin of profit that stays with them—that is not swallowed up by "free service."

Selden "In-built Quality" provides Selden Trucks with the strength to work on indefinitely at low cost—to carry their own loads without constant calls upon the dealers for service that eats up profits on sales.

Selden Dealers know that one Selden Truck in service means more later—that their sales of Selden Trucks are limited only by the user's need for trucks—that repeat orders on Selden Trucks invariably follow initial sales. And back of every Selden Truck stands the reputation of the Selden factory for square dealing with its dealers and their customers.

Ask Selden Dealers about the sales organizations they are building with Selden factory co-operation.

To aggressive, farsighted dealers we still have some territory to offer, though not a great deal. Write us if you would like to become a Selden Dealer.

The Magazine "TRUCK TRANSPORTATION" will be sent free to all interested. Write Dept.PW

SELDEN TRUCK CORPORATION
Rochester, N. Y.

Ship by Truck—SELDEN Truck

1½, 2½, 3½, 5 Ton Worm Drive Models

Selden Motor Trucks

SELDEN TRUCK CORPORATION, Rochester, N.Y., U. S. A.

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—a new margin of wearing strength

at a reasonable price without excess weight. Every wearing part of the new Stoughton *Oversize* Truck is built for greater strain resistance and service.

The Stoughton *Oversize* Truck proposition offers unusual advantages to the dealer. The Stoughton name has been a well-known mark of dependability and extraordinary value for over fifty years. Stoughton *Oversize* construction eliminates service expense and keeps the truck permanently sold. There is both pride and profit in handling the Stoughton.

Write or wire for dealer proposition today.

The Stoughton Wagon Co.
Stoughton, Wis.

STOUGHTON
Oversize TRUCKS

Horse Power

As the horse's vitality depended upon the care and feed given it, so the motor's efficiency depends upon the gasoline and oil fed to it.

Dust and dirt in an oil has a tendency to form a sticky gum which grinds the cylinders as well as causes carbon.

Gasoline that is exposed to the air becomes stale and lifeless. It loses its "pep."

BOWSER STORAGE SYSTEMS

keep the life in gasoline and oil. There is no evaporation of vitality from the gasoline, no dirt getting into the oil.

Write today for Bowser literature which explains. Sent without obligation to you.

S. F. BOWSER & CO., Inc.
Fort Wayne, Indiana,
U. S. A.

Branch Offices in 21 Cities of the U. S.
Canadian Office and Factory, Toronto, Ont.

London
32 Victoria St., S. W. 1
Havana,
Lonja del Comercio 427
Paris,
5 Rue Denis-Poisson
Sydney,
6 Castlereagh Street

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A Grease Gun on Every Bearing

Not one that must be attached every time grease is needed

—but one that remains on the bearing without refilling for 15 to 35 greasings—

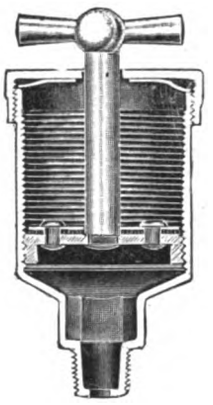
depending upon the size used and the part to be lubricated.

EMPRESS Plunger Feed Grease Cup No. 214

does the work of a grease gun or similar device more affectively, readily and easily. Simply fill and attach, giving the handle one-half turn when grease is needed. Seldom necessary to get under the car, the handle is usually within reach, but for cases where it cannot readily be reached extension nipples can be used.

No. 214 Marine Leather Packed Grease Cup

TESTED UP TO 1000 POUNDS PRESSURE WITHOUT LEAKING



Drawn from rolled sheet metal, these cups combine lightness with strength, they are built to withstand the roughest kind of service. Fitted with a locking device, the cap is effectively prevented from jarring loose, it locks at every quarter turn, not effected by vibration. Made from brass and steel, in five sizes and in several finishes. The leather packing on the plunger insures an even pressure at all points and prevents leakage.

WRITE FOR CATALOG R—TODAY

It gives full description of this cup and others.

BOWEN PRODUCTS CORP.

AUBURN DIV., AUBURN, N. Y. MINNEAPOLIS DIV., MINNEAPOLIS, MINN.
WINKLEY DIV., DETROIT, MICH. ZERK DIV., CLEVELAND, OHIO
CANADIAN FACTORY—CANADIAN WINKLEY CO., LTD., WINDSOR, ONT.

SALES OFFICES

NEW YORK, 220 BROADWAY CHICAGO, 1637 OTIS BUILDING
BOSTON, 253 FRANKLIN STREET CINCINNATI, 409 LYRIC BUILDING
SAN FRANCISCO, MONADNOCK BLDG.

Repeat orders

That's what you want. To sell a customer a motor truck which is so good he will order more.

The man who sells, and the customer who buys, alike with with the operator who drives

Wilson *dependable* MOTOR TRUCKS

are soon convinced that Wilson's are true repeaters. Many users increase their equipment by simply phoning their additional orders to Wilson dealers.

It is the truck for you to handle.

1-1/2, 2-1/2, 3-1/2 and 5 tons all worm drive.

J. C. WILSON CO., Detroit

37th Year

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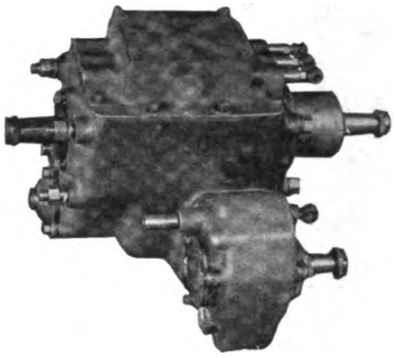
FULLER TRANSMISSIONS



The call is more and more insistent for trucks equipped with means of utilizing the engine power to operate dump bodies, hoists, winches, etc.

The truck equipped with Fuller transmission can answer that call, as a Fuller Power Take-Off may be attached to Fuller Transmissions and also a tire pump may be attached for the pneumatic equipped truck.

Manufacturers of transmissions, clutches, and controls exclusively.

FULLER & SONS MFG. CO.

KALAMAZOO, MICHIGAN

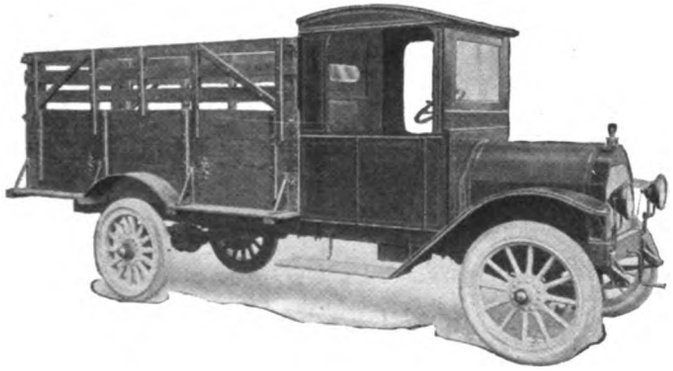
Kresge Building, Detroit, Mich. American Circle Building, New York, N. Y. Rialto Building, San Francisco, Calif.

The Luverne Farm Truck

Capacity Two Tons

PRICE $1800.00

Including Electric Starter and Lights, Semi-Enclosed Cab and Combination Grain and Stock Body



These trucks have been on the market for over three years, during which they have fully proven their ability to meet the requirements of the **Farm Trade** in a superior manner.

Ask for our Dealers' Proposition

LUVERNE MOTOR TRUCK COMPANY

LUVERNE MINNESOTA

RADIATOR INSURANCE

GUARANTEED FOR THE LIFE OF THE TRUCK

These Seamless Helical Tube Cooling Sections are perpetual insurance against radiator trouble.

Write for complete information.

Rome-Turney Radiator Co.

Rome, New York, U. S. A.

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REYNOLDS

MOTOR TRUCKS

1½, 2½, 3½ and 5-ton capacities

Proved the sensation of the recent Detroit Auto Show, where they were displayed for the first time. Their great strength, power and durability, backed by the financial soundness and responsibility of the company, insures satisfactory freight haulage.

Desirable territory is open to responsible distributors

REYNOLDS MOTOR TRUCK COMPANY

MT. CLEMENS, MICHIGAN

Pressed Steel Frames

The largest and best equipped Frame plant in the world

A.O. SMITH CORPORATION

MILWAUKEE

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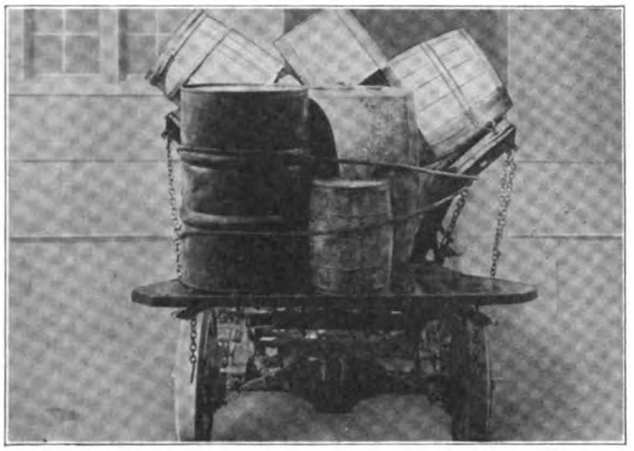
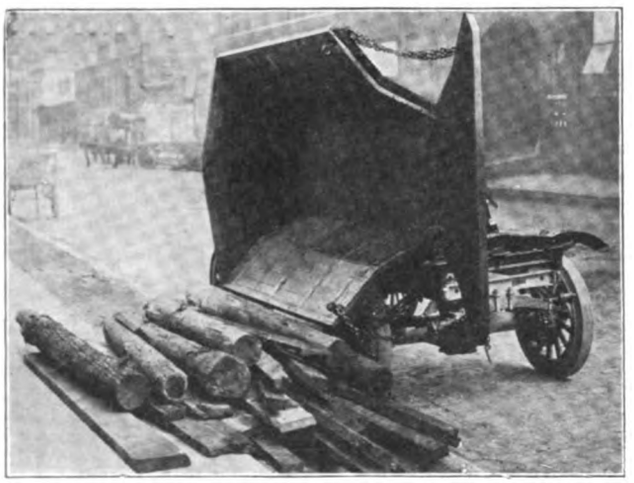
LEE LINE

Trailers—Bodies—Loaders

Express Type Side Dump Body



Most people think of "loose material" as a product of pit, mine or quarry, i. e. gravel, crushed stone, ore, coal, etc, Used in connection with Lee Dump Bodies, the term takes a wider significance and embraces rough lumber, lath, brick, bag cement, grain, loose and in bags, sugar beets, sugar cane, cotton and hundreds of other products hauled by motor trucks.



Conserve the truck's valuable time by dumping instead of unloading by hand whenever possible. Save from twenty minutes to two hours each trip.

Lee "Express Type" Side Dump bodies operate the same as the "Standard" Side Dump, but have an end gate useful when non-dumpable merchandise is carried.

If it is a Trailer, Semi-Trailer, Motor Truck or Trailer Body or special handling or hauling equipment—we make it.

LEE LOADER & BODY CO.

Builders of Automotive Auxiliary Equipment

2340 So. La Salle St. Chicago

Let us Prove to You that

OSHKOSH

4-wheel-drive-truck

hauls a capacity load at greater speed on less gas, than other two ton trucks.

The Oshkosh 4-Wheel Drive attains practically 100% transmission of motor power to the four wheels, all of which are driving wheels—front ones pulling and rear ones pushing.

In this truck there is virtually no power loss due to road slippage, whereas with the two-wheel drive the average loss, even on good roads, is 20%.

A few profitable territories are open. Write immediately for information.

Oshkosh Motor Truck Mfg. Co.

Oshkosh, Wisconsin

THE HEIL CO.

Combination Dump Bodies

The utility of Heil's Combination Steel Dump Body, equipped with a Hydro Hoist, is unlimited. Having removable sides, it can be used for hauling anything from lumber to coal. Body Model 3 in 1 shown, meets the needs of the Building Supply Dealer.

Circular 110 gives a complete description of Hydro Dumping Equipment.

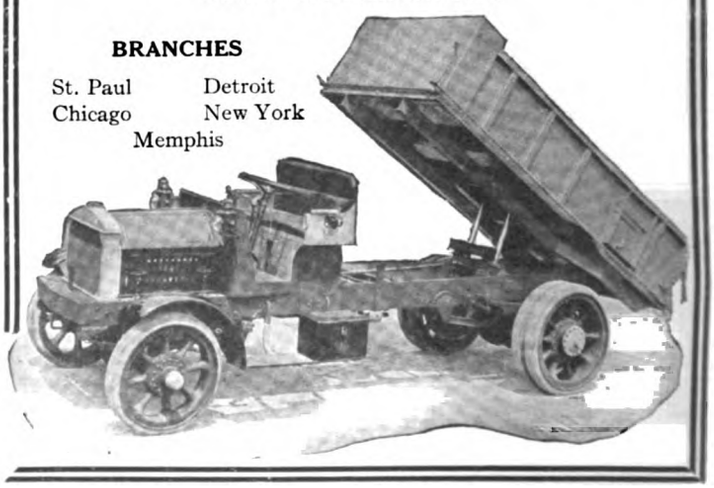
THE HEIL CO.

Milwaukee Wisconsin

Offices 1140 Montana Ave.

BRANCHES

St. Paul Detroit
Chicago New York
Memphis



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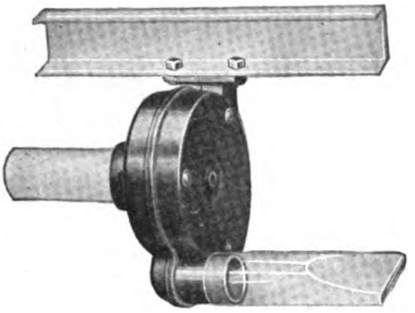

THE VACUUM MUFFLER

An entirely new development in muffler design, overcoming in a scientific and practical way the biggest faults of the old style mufflers. Offers practically no back-pressure and guaranteed BLOW-OUT PROOF.

Approved as standard equipment by over eighty truck and tractor manufacturers.

THE VACUUM MUFFLER CORP'N OF AMERICA

Tribune Bldg. **New York**

Wolverine

The Truck of Good Service

The Wolverine was "dubbed" such by a user who bought one, then a second and now a third. He bought on **Performance.**

That the Wolverine contains units that the trade recognize as of the best is but natural. No more careful workmanship is used on any truck, nor is the average factory test and inspection as critical.

All this has produced a truck that you can sell on its strength to do the job continuously—to perform economically.

If you are looking for a truck of such nature to sell at a moderate price, wire us for territory and terms.

Of course, the "Wolverine" is equipped with a self starter and electric lights.

American Commercial Car Co.
DETROIT, MICHIGAN

EVERY DAY
MOTOR TRUCK CAB

The day will soon be here when every truck will be equipped with a closed cab. Why? A closed Cab protects the driver in all kinds of weather and enables him to work at maximum efficiency all the time.

This insures full time for the truck and low cost of upkeep which spells truck efficiency.

The Perfect Cab for All Seasons

The EVERYDAY cab is quickly convertible to the needs of the season—completely closed for winter, semi-closed for changeable weather, and open in hot weather.

It is a **Highland** product, conforming to the same high standards of design, adaptability, material, and workmanship as the **Highland** standard bodies.

Specify the **Highland** EVERYDAY cab on all your trucks.

The Highland Body Manufacturing Company
1114 Elmwood Place **CINCINNATI, OHIO**
Detroit Branch: Holden and Greenwood Avenues

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Announcement

The new B-3 Joint is the culmination of 15 years' specialization in the building of Universal Joints.

Our engineering department has the co-operation of America's best automotive engineers. This co-ordination of brains—backed by an efficient and progressive organization—is responsible for the superiority of the B-3 Joint.

Write for complete information.

Blood Brothers Machine Company

Pioneer Makers of Universal Joints

Allegan **Michigan**

GRANT TRUCKS

One-and-a-half and Two-tons

Complete Equipment—Electric Starting and Lighting

Write for interesting dealer proposition

GRANT MOTOR TRUCK CORPORATION

CLEVELAND

CELLULAR TYPES:
Wire Mercedes
Square Wireless
Diagonal Wireless

TUBULAR TYPES:
Square Fin
Round Fin

Send Us Your Blueprints and Specifications.

THE G & O MFG. CO.
New Haven, Conn.

G&O Radiator

ARCADIA TRAILERS

Four Wheels—1, 2, 3½ and 5 tons
Semi-Trailers—2, 4 and 6 tons
Log and Pole Trailers—2, 4 and 6 tons

You can no longer figure your customer's transportation problems without giving consideration to trailers. Arcadia Trailers are built to meet this need.

DEALERS—Some good territory is ready for you. We have a "Trailer for Every Trade" with bodies to fit, built under one roof. Write for information.

Arcadia Trailer Corporation
23 Murray Street
Newark, New York State

Sole Foreign Sales Representative, Automotive Products Corp., Woolworth Bldg., New York.

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The K & L Efficient Radiator

We invite mechanical engineers to analyze our style "A" core.

Important Features

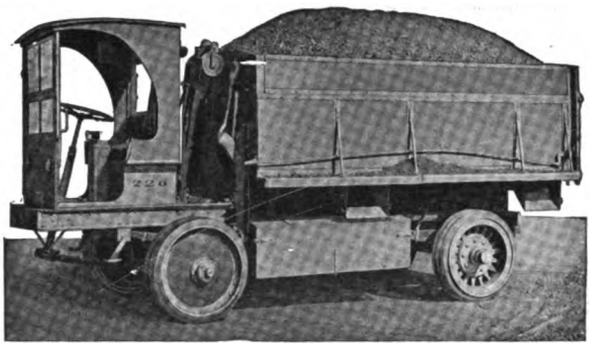
System of expansion not contained in any other core. It absorbs the constant shock and vibration and lessens strain on soldered parts. This lengthens life of core, also reduces damage resulting from freezing to a minimum.

Our system of baffling the water, still maintaining free flow to accomodate either pump or syphon system.

3" Core } **Maximum Radiation, 19 sq. in. to 1 sq. in. of area**
Water Capacity, 2½ Pts. per sq. ft.

Send for report of preliminary tests. Send us your B-P'S and engine data and let us prescribe for your particular requirements and give you quotations.

THE K. & L. RADIATOR MFG. CO.
215-17 West 31st St., Chicago



Front or Four-Wheel Drive Trucks and Tractors

Conservation is the key to success. ***Couple-Gear*** is the method, saves men and horses. Derives its propelling force from water flowage. The ***best*** is the ***cheapest.***

Your inquiries are solicited

Couple-Gear Freight-Wheel Co.
1550 Buchanan Ave., GRAND RAPIDS, MICH.

Couple-Gear Power Truck Co.
Peoples Gas Building, Chicago, Ill.

Couple-Gear Electric Truck Co.
179 W. First St., S. Boston, Mass.

Time Out Means Money Lost— Giant Grips Keep Trucks Going

GIANT GRIP Traction Equipment is a profit maker both for dealer and truck owner. It keeps trucks operating under any road conditions, through mud and snow, sand and gravel and over icy streets.

Clamps permanently attached to wheels, cross-chains and hooks kept in tool box and hooked on in two minutes' time when needed. No tools, no jacking up the truck.

Get the bigger sales of a well advertised and widely known product. Don't put off writing for our dealer proposition. Giant Grip Traction Equipment means fewer models to handle than in any other line, yet a size to fit every truck. Dept. 25

CHALLONER COMPANY (*Established 1863*) **OSHKOSH, WISCONSIN**

Giant Grip

Traction Equipment for Motor Trucks

2½, 3½, 5 Tons ***Worm Drive***

To the Front

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Present day construction work calls for the superlative in truck operation.

The number and the quality of the orders received for Sanford trucks indicates how the Sanford stands with representative firms.

Sanford Motor Truck Co., Syracuse, N.Y.

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COVERT TRANSMISSIONS

Strength—Durability—Power

The above qualifications account for the demand for Covert transmissions among leading motor truck manufacturers.

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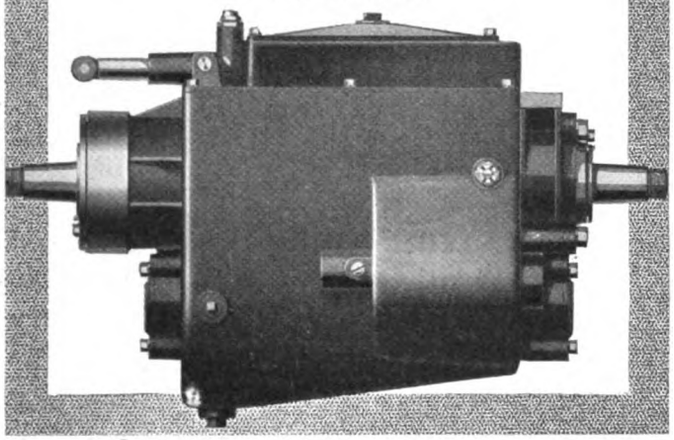

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"America's Greatest" TRUCK

attracted marked attention at the Chicago Truck Show

of the hundreds of trucks exhibited there, **not one** embodied as complete an array of **super-specifications** as were shown in the Mutual.

It was a matter of comment that the more truck-wise a visitor was, the longer he stayed at the Mutual exhibit, and the more thoroughly he posted-up on its every detail.

The Mutual Truck is built in 2 ton, 3 ton and 5 ton units, solid tires and 2½, 3½ and 6 ton pneumatics.

Send for our Folder

Mutual Truck Company
Sullivan - - - Indiana
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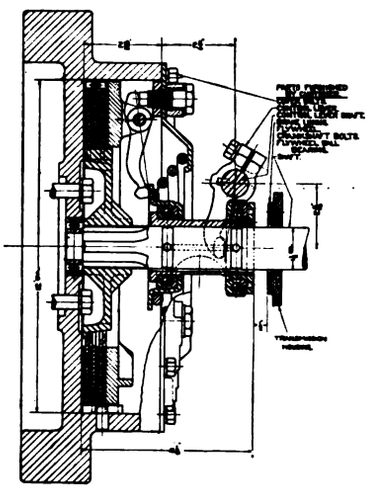

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The very large friction surfaces in this clutch simplifies and insures smoother operation in every way. Accurate adjustment is easily made by an arrangement of steps on the face plate.

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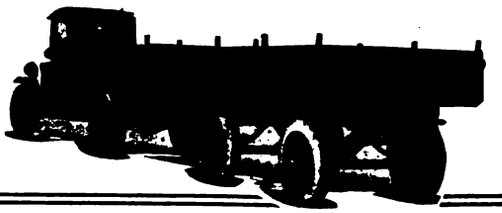

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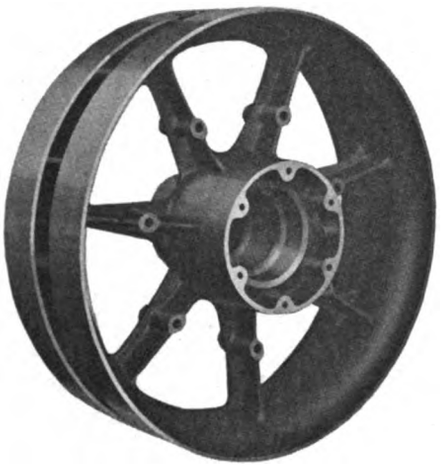

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"Watch the WEST STEEL WHEELS Go 'Round"

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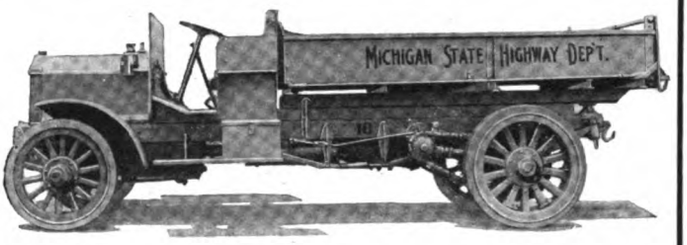
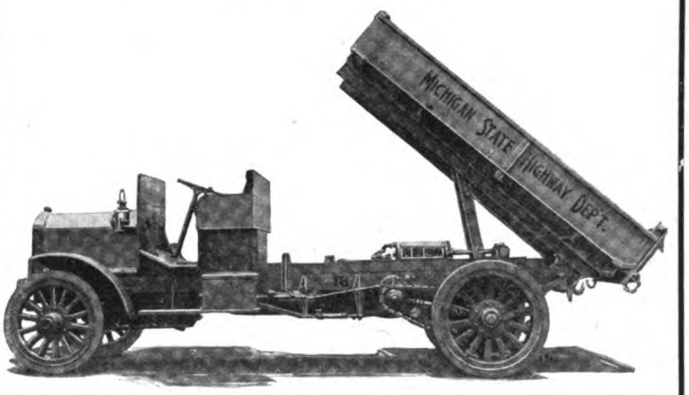
HORIZONTAL HYDRAULIC Dumping Units



Utilizes Entire Loading Space

The Horizontal Hydraulic Dumping Unit utilizes the entire loading space back of the driver's seat. The full length body equalizes the load on the chassis frame. No part of the hoisting equipment extends below the chassis frame.



A High Dumping Angle

The unusually high dumping angle assures a quick, clean discharge.

Makes Trucks More Efficient

The smooth, instant action — the absence of all strain on the chassis and the quick, clean discharge of the load mean more trucking hours and longer life for your trucks.

Write for information. We can supply dumping units to precisely suit your needs —for any make of motor truck.

Horizontal Hydraulic Hoist Co.

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Sales and Service Stations: Chicago — Detroit

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Trucks of Wider Utility

Built For Higher Speed and More Work Per Day

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The *modern* truck must be *built* for speed—not only in tire equipment, but in every other detail. Motor, transmission ratios, springs, brakes, weight distribution, and many other things must be properly proportioned to give speed with *reliability* and *safety*.

There is a line of trucks so constructed—built to meet the new demands of merchant and farmer.

Find Out About It!

Write today for details. It won't obligate you and it may mean much to you.

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NEW DESIGN SPEED TRUCK
424 GOEBEL BUILDING DETROIT

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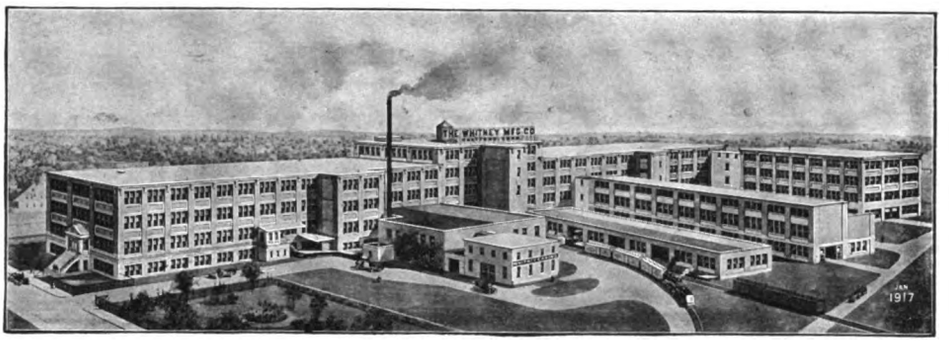
Roller Type



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Equip Your Motor Trucks and Tractors with "Whitney" Chains

Now that the motor truck is handling so much of the freight that was formerly cared for by the railroads, it must run on a schedule almost as exacting as that of the railroad train itself. This emphasizes the necessity of selecting a chain which can be relied on under all conditions of speed, road and weather.

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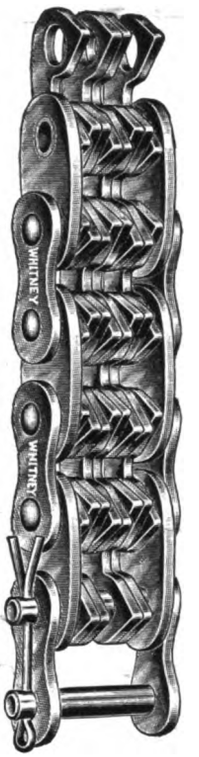

Silent Type

"The Spring is the Thing"

MATHER SPRINGS

Scientifically Heat-Treated

Unequalled For

Lightness, Flexibility and Endurance

Genuine made only by

THE MATHER SPRING COMPANY

Toledo, Ohio.

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Stewart

MOTOR TRUCKS

Eight Stewarts owned by U. S. Treasury Dept., Washington, D. C.

Repeat orders the backbone of Stewart dealers' success

In hundreds of cases the first Stewart truck has gradually become a fleet—all Stewarts. This sort of repeat business proves owners' satisfaction as no other fact can—satisfaction with price, upkeep and running costs, daily work, capacity, long life.

It isn't the purchase of a big fleet at one crack that tells the story—it is the pyramiding of the success of the first truck by adding more Stewarts to keep pace with growth of business.

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FIVE SIZES

¾ ton Chassis	1 ton Chassis	1½ ton Chassis	2 ton Chassis	3½ ton Chassis
$1350	$1750	$2250	$2875	$3895

F. O. B. Buffalo

Thousands are in use throughout the world—in over 600 American cities, on hundreds of farms, and in 27 foreign countries.

Stewart Motor Corporation, Buffalo

Quality Trucks Since 1912

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POWER WAGON

Number 185 CHICAGO, APRIL, 1920 Price 15 Cents

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Caterpillars save truck depreciation, decrease repair costs, cut down gasoline and oil consumption and give amazing traction.

They will both increase the efficiency of your trucks and enable them to operate more economically.

Kelly-Springfield Tire Co.
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KELLY SPRINGFIELD TRUCK TIRES

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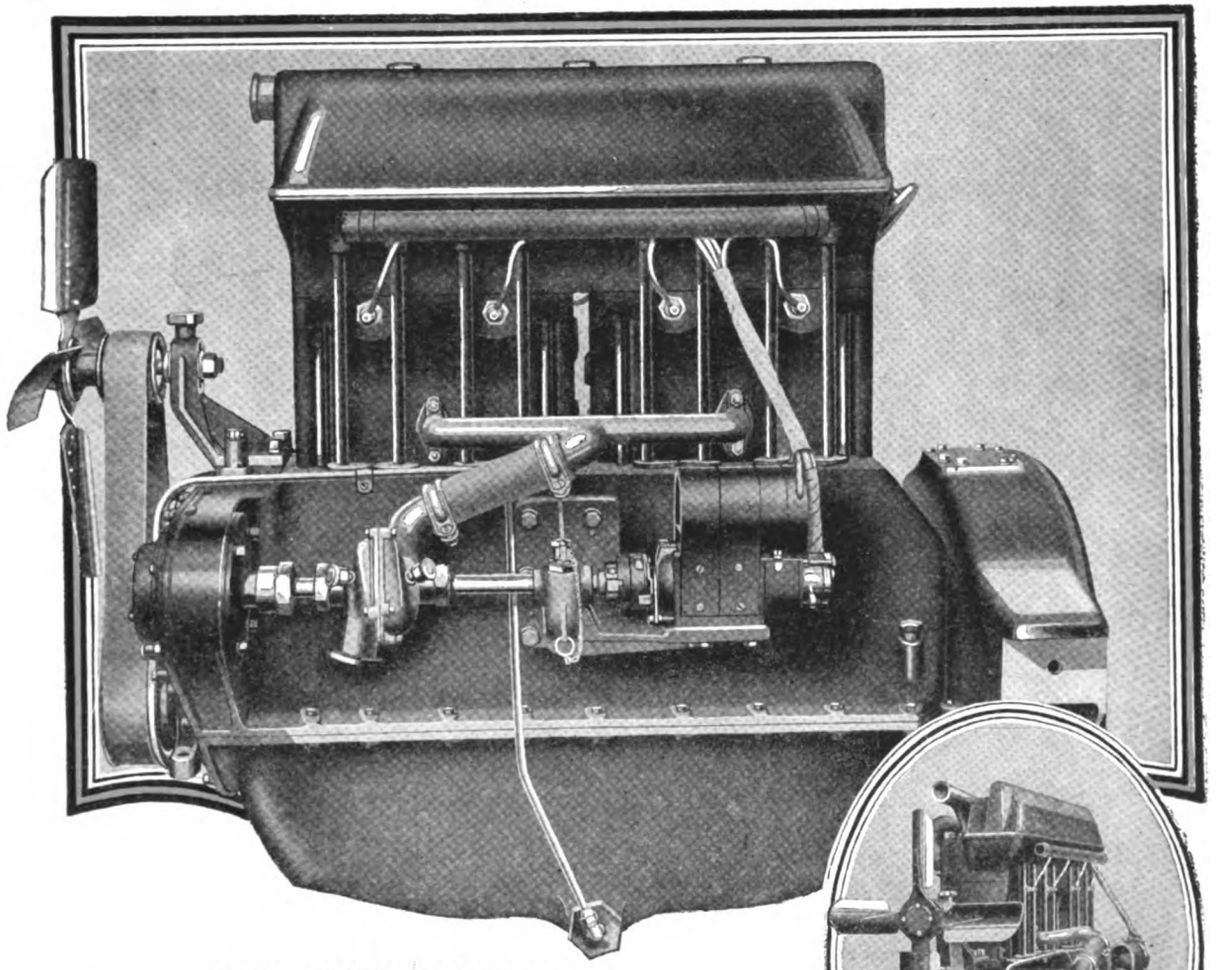
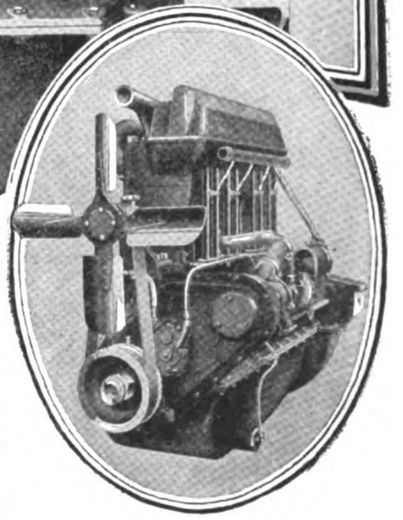
TRUCK and TRACTOR ENGINE





Midwest 4½ x 6", 3point suspension, high speed, heavy duty Truck Engine, furnished with either No. 2 or No. 3 S. A. E. bell-housing.

APPROVED BY THE LEADING TRUCK ENGINEERS OF THIS COUNTRY

The Midwest Truck Engine expresses the composite desires of the best truck engineers in the country. They have sensed for years the growing demand for increased average speed in heavy-duty trucks—they have watched, with interest and concern, the many semi-successful attempts to render *high speed,* heavy-duty service with low speed, heavy-duty engines.

These engineers have given the Midwest engine test upon test. They have tried in every manner to find *one spot* in the design of this engine that would not measure up to present day standards, but—they have found an engine so effectively lubricated—so rigidly over-sized in crankshaft and all component parts—and so masterfully assembled that they admit that here at last is the first real heavy-duty, high speed truck engine that will satisfactorily and continuously deliver constant service under full load—at a guaranteed engine speed far above that attempted, or delivered, by any other engine on the market.

Some open capacity available on the 4½ x 6" and 4⅛ x 5¼" sizes.

Before you make new engine contracts let us talk over your truck engine requirements.

Please Address Sales Division 16.

MIDWEST ENGINE COMPANY
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Every Long Cooling System is scientifically adapted to the Engine which it serves, thereby assuring maximum cooling efficiency

IN THE Automotive Industry the reputation and position of Long Cooling Systems are securely established. Mere mention of Long suggests that indefinable something—everything—that spells completeness, dependability and success in radiation.

No engine is more efficient than its cooling system.

Every engine aided by the Long Cooling System may operate to its utmost capacity free from radiation troubles.

LONG MANUFACTURING CO., DETROIT, MICHIGAN

Pioneer Makers of Cooling Systems for Gasoline Engines

LONG
COOLING SYSTEMS

The Recognized Standard for Tractor, Trucks and Motor Cars.

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PRECISION
BALL BEARINGS
(PATENTED)

"SILENCE is golden" might have been written about "NORMA" Bearings—for their silent-running qualities are an evidence of that precision of manufacture which minimizes friction and adds to the useful life of the high-grade magnetos and lighting generators in which they are the standards.

See that your electrical apparatus is "NORMA" equipped.

THE NORMA COMPANY OF AMERICA
Anable Avenue
Long Island City
New York

Ball, Roller, Thrust and Combination Bearings

POWER WAGON

An exponent of the most enlightened thought and practice of the motor truck industry.

Published monthly by
THE POWER WAGON PUBLISHING COMPANY
544 Lake Shore Drive, Chicago, U. S. A.

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The real efficiency of a motor truck depends very largely upon the ease with which it can be handled. This is one of the most vital of all considerations for the man who buys a truck, or for the manufacturer or dealer who sells it. Ease of handling, in turn, depends essentially upon the steering gear with which it is controlled.

Ross Steering Gears, with their enormous bearing surfaces, mean an easier day's work for the driver, and at the same time a bigger return to the employer in greater service from both the truck and the man who drives it. This increased efficiency reduces delivery costs and makes satisfied owners.

In order to insure their customers of the easy steering, the safety and the reliability which Ross Steering Gears guarantee, 166 motor truck manufacturers are now using them as standard equipment. They know that Ross Steering Gears mean contented drivers and satisfied owners.

Write for any further information desired

ROSS GEAR & TOOL COMPANY
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The Steering Gears that Predominate on Motor Trucks

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Clydesdale Dealers Have an Advantage

DEALERS who handle the Clydesdale welcome an opportunity of testing it against any other truck for they have found that Clydesdale always comes through in a pinch.

Of course Clydesdale has a distinct advantage over all other trucks because it is the only truck equipped with "The Driver Under The Hood", the automatic controller.

This little instrument so intelligently directs the motor that the maximum of power is always forthcoming in the pinches.

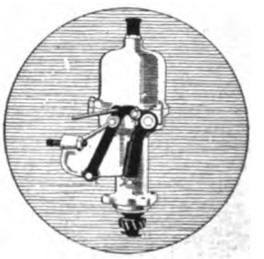
For instance, when the truck hits a bad chuck hole, before the driver has a chance to touch the throttle "The Driver Under The Hood" has summoned the necessary power and the truck moves out of the hole with hardly a slackening of speed.

This ability to come through in the pinches has made a name for Clydesdale in thirty-five countries under conditions varying from the sands of Sahara to the bitter cold of Iceland.

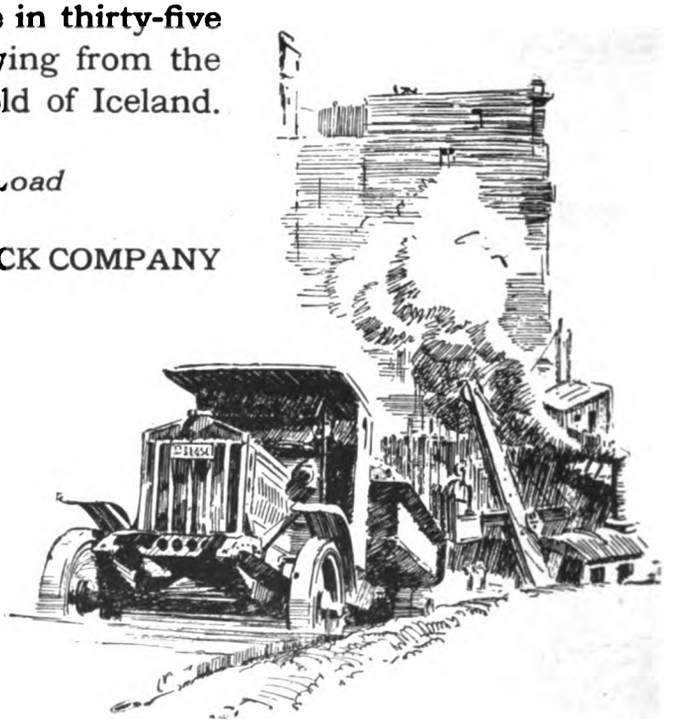
One to Five Tons Net Load

THE CLYDESDALE MOTOR TRUCK COMPANY
CLYDE, OHIO

No Other Truck Has it



"The Driver Under the Hood"



CLYDESDALE

A World Proven Motor Truck

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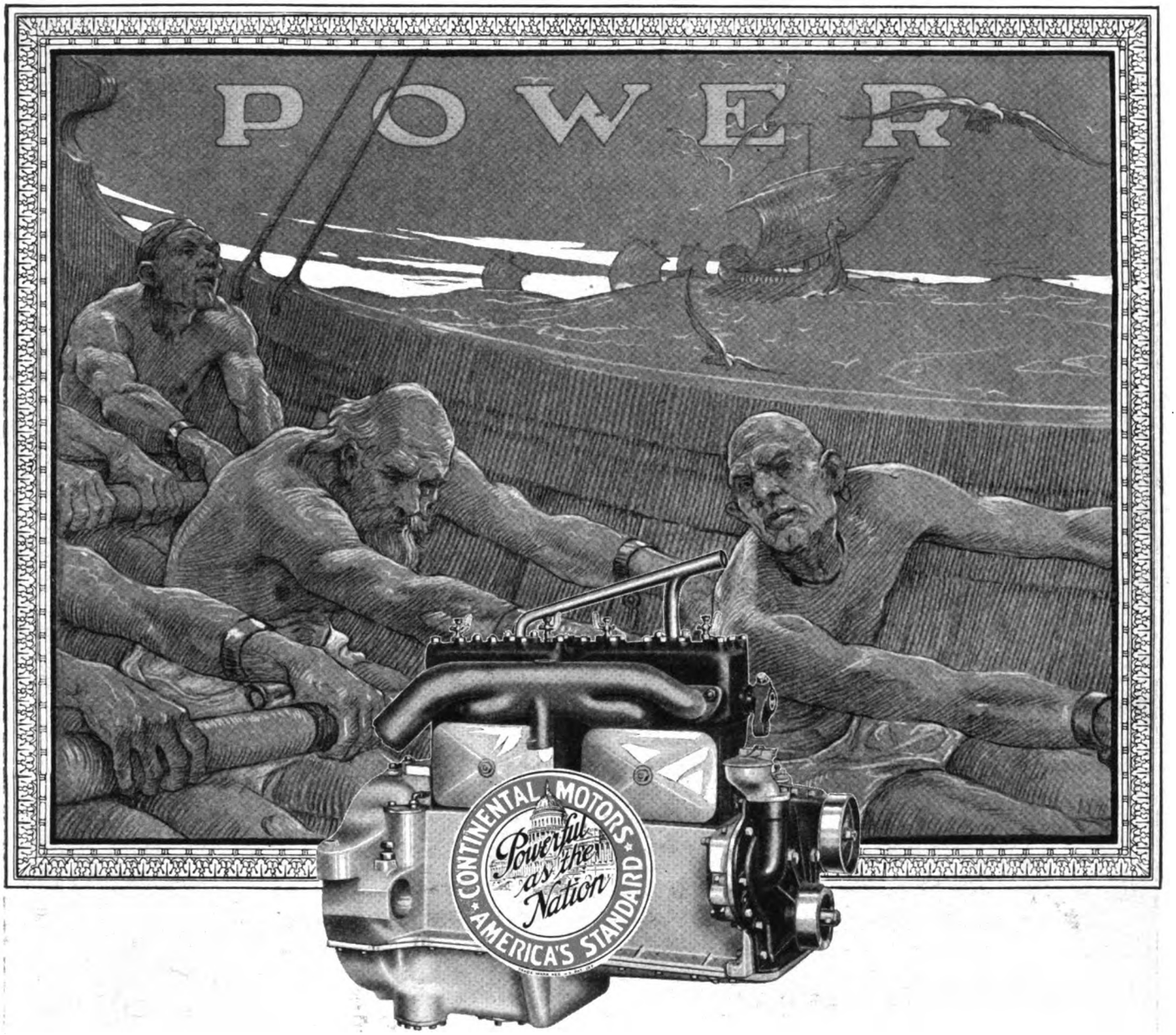

Just as the body-power of man was at one time MULTIPLIED to produce the energy required for performing giant tasks, so today, is the brain-power of every individual of the Continental organization MULTIPLIED to produce the Red Seal Motor. ¶ The production of so vital a part of the motor car or truck or tractor is a project that is worthy of the highest type of specialization. ¶ Only by UNDIVIDED EFFORT — only by CONCENTRATION upon this one vital product, could the Continental Motor be of the high standard of quality that the world looks for and finds, in the product which is Continental equipped.

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Offices: Detroit, Michigan Factories: Detroit-Muskegon

Largest Exclusive Motor Manufacturers in the World

Continental Motors

STANDARD POWER FOR TRUCKS, AUTOMOBILES AND TRACTORS

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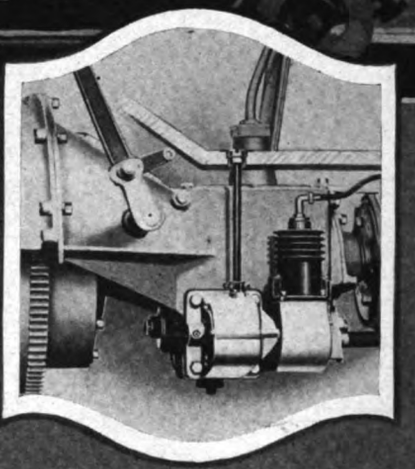

"Both are Passenger Cars"

THE light sport car and the 5th Avenue Bus are both passenger cars—but what a difference! Where the ordinary tire carrying an air pressure of 60 to 90 pounds will do for the passenger car, the heavy bus when it uses pneumatics must adopt the masterpiece of the tire maker's craft, the giant pneumatic with its pressure of from 150 to 175 pounds.

And yet the terrific pressure requirements of this big "passenger car's" tires can be met by the same make of air compressor as has served so well for its little brother—the Kellogg Engine Driven Tire Pump.

KELLOGG MFG. COMPANY
Rochester N. Y.

KELLOGG
Engine Driven
Tire Pump

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The fact that so many GMC dealers have been outstanding successes in the truck field points to what the future holds for dealers and prospective dealers.

Here is a truck manufacturing concern which has laid a broad foundation for future business by establishing genuine quality as the keystone of its manufacturing policy.

The General Motors Truck Company is not only one of the world's leading manufacturers in its line, but it has at its command manufacturing resources not exceeded by any other.

It has sales and service experience accumulated during the life of the motor truck industry, and every facility now is at hand.

GMC engineering resources and GMC financial backing, combined with these other assets, give a selling connection all the promise of profit a dealer need wish.

We know of no better way to judge the future than by the past, and the past abounds with the unstinted praise of owners who have proved the genuine quality of the GMC product.

GENERAL MOTORS TRUCK COMPANY

One of the Units of the General Motors Corporation

PONTIAC, MICH., U. S. A.

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General Motors Trucks

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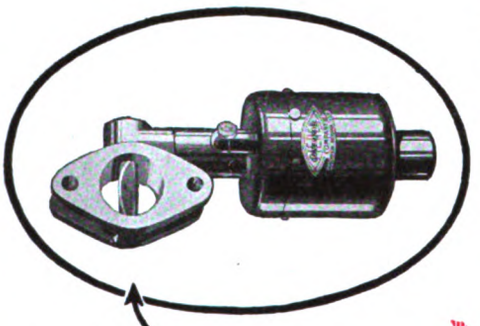
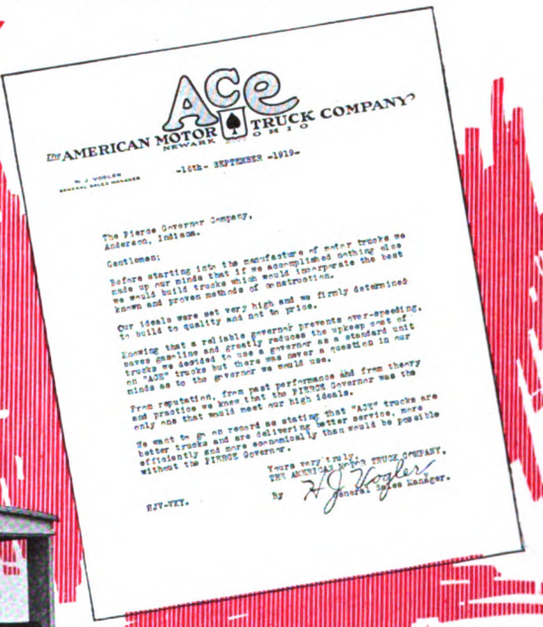
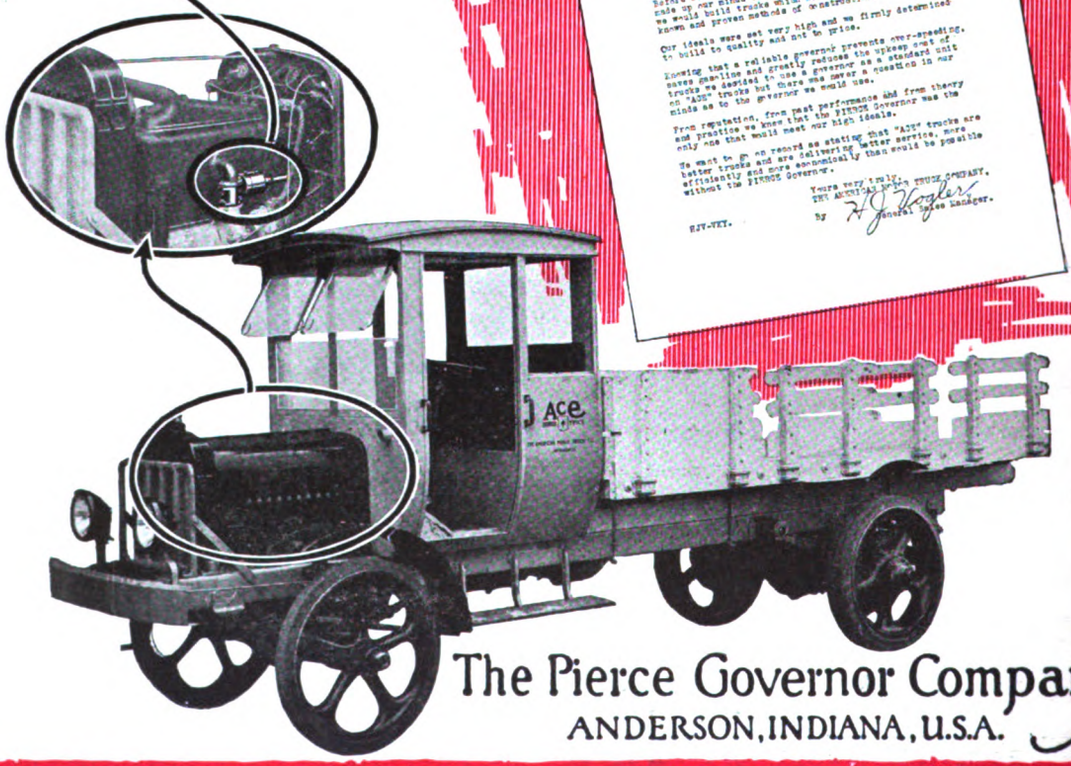
PIERCE Governors

Standard Equipment on Ninety-Nine of the Best Makes of Motor Trucks—

-and here's the reason why







The Pierce Governor Company
ANDERSON, INDIANA, U.S.A.

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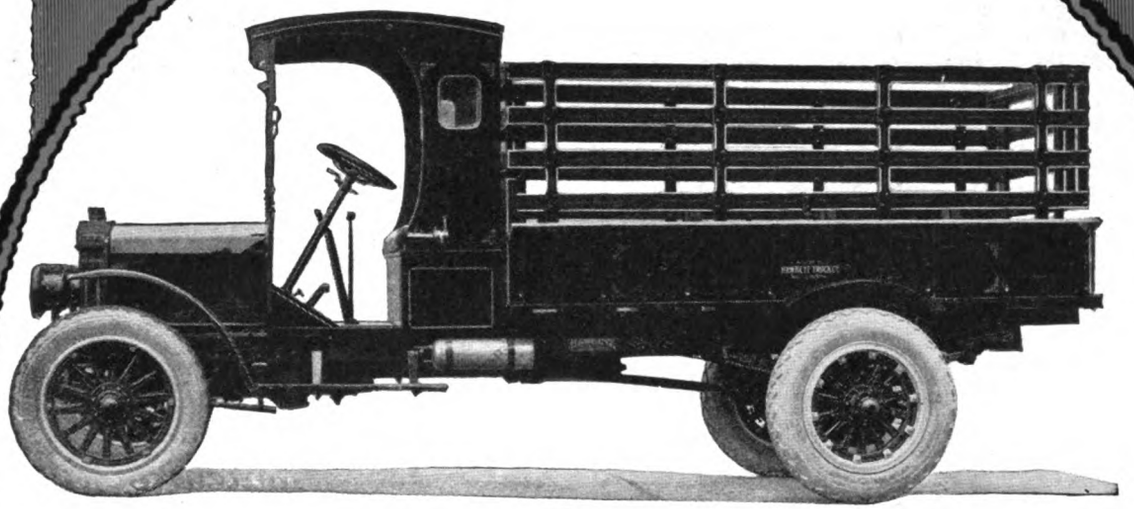
Hawkeye Trucks are made in three sizes—1½ Tons, 2 Tons and 3½ Tons.



The fact that hundreds of Hawkeye Trucks have been giving satisfaction for three years in rough and tumble farm service in the West and Northwest proves Hawkeye quality.

Hawkeye Trucks are built with a larger "factor of safety" than most other trucks selling at a similar price. The best engineering, the best materials and the best workmanship are combined to give the Hawkeye owner the truck he has a right to expect.

Over 170 parts are made in our own factory, but Hawkeye Trucks include such tested units as Buda Motor, Clark Internal Gear Axle, Fuller Transmission, Gemmer Steering Gear and Eisemann Magneto.

An interesting proposition to dealers. Write for it.

Hawkeye Truck Company

R. A. BENNETT, *President*

2704 Floyd Ave.

Sioux City, Iowa

HAWKEYE

MOTOR TRUCKS

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Speaking of CONCRETE ROADS STREETS and ALLEYS

53,000,000 Square Yards Were Placed Under Contract During 1919—

Over twice that of any previous year. Every state—your state—contributed to this total. Public preference is expressed in this record. Watch 1920!

Concrete highways defy the poundings of traffic year in and year out. They won't blow away during dry weather, won't wash away in wet weather. Let weather and season change—the road won't—for any day, any season is just the same to a concrete road. It's not what they cost to build but the little they cost to maintain that makes concrete pavements economical.

People know what they want and ask for it—***concrete***—a dollar of value for every dollar that they are so generously investing in improved highways.

PORTLAND CEMENT ASSOCIATION

Atlanta	Helena	Minneapolis	Salt Lake City
Chicago	Indianapolis	New York	San Francisco
Dallas	Kansas City	Parkersburg	Seattle
Denver	Los Angeles	Pittsburg	St. Louis
Des Moines	Milwaukee	Portland, Oregon	Washington
Detroit			

Please mention "Power Wagon" when writing to advertisers.

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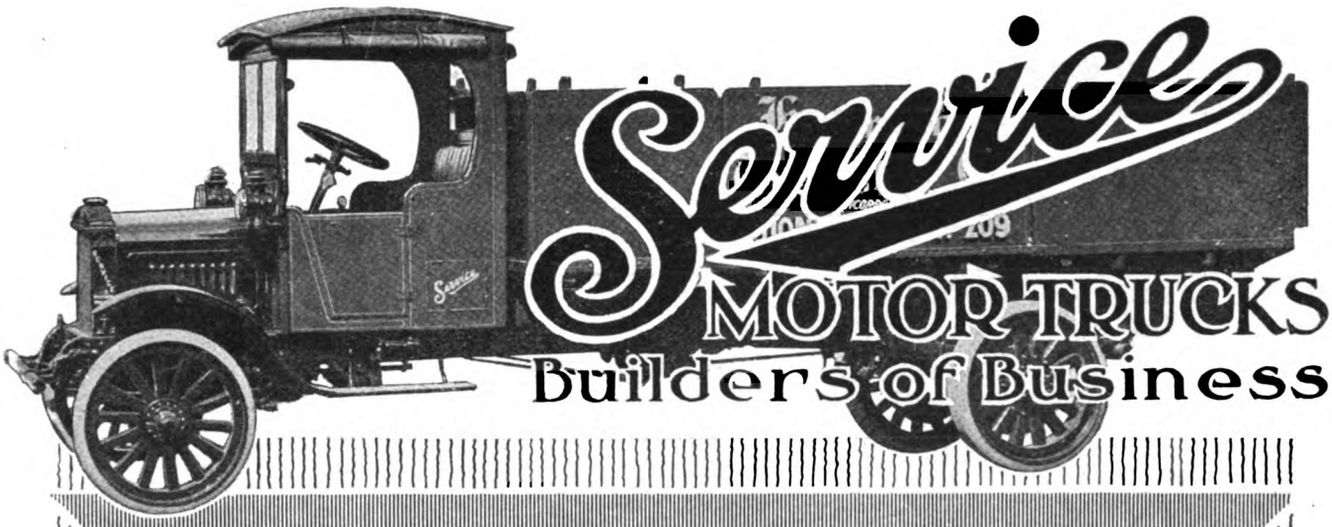

After the Truck is Sold

The SERVICE dealer can offer his trade more than a dominant truck value. Back of every SERVICE Motor Truck stand the entire resources of a great and sound organization. After a sale is made there must be *satisfaction without compromise.* National advertising creates sales opportunities. Proven performance closes them profitably.

The Auburn Auto Sales Co., Service dealers located at Pueblo, Colorado, wrote as follows to a prospective dealer:

> *"We have SERVICE Trucks running in fleets, and are responsible for them in this section, as we had the first SERVICE Trucks shipped to this part of Colorado. We are proud to state, with all our experience of the past seven years in handling automotive products, that we made no mistake when we installed SERVICE Trucks in our line. We further wish to state that we have never had dealings with any factory that was as just as the Service Motor Truck Company. They are at all times ready to give you all the assistance possible in helping you make sales, in advertising, and in sending letters to your prospects.*

Write today. Let us show you how a Service dealer's franchise will prove most profitable for you. State the territory you desire. Seven models from 1 to 5 tons.

SERVICE MOTOR TRUCK CO.
WABASH, IND., U. S. A.

NEW YORK—87-89 West End Ave. **CHICAGO—2617-25 So. Wabash Ave.**

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MR MARLIN-ROCKWELL INDUSTRIES MR

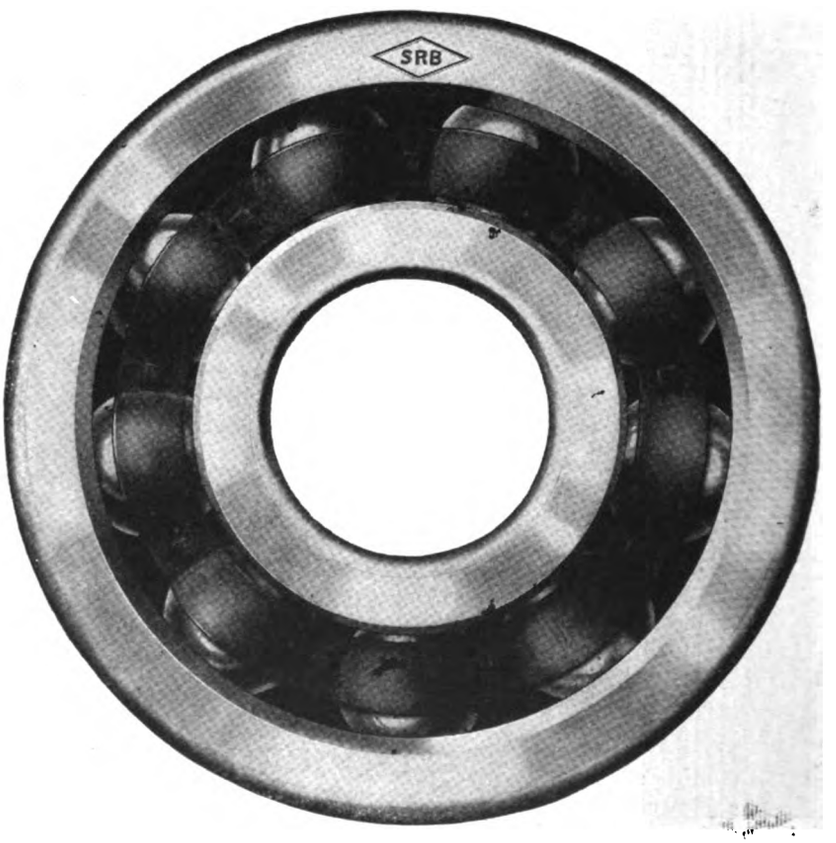
The Constantly Increasing Number of Automobile, Motor Truck, Tractor and Machinery Manufacturers Using Them, Evidences the Broadening Appreciation of the Superior Quality of S. R. B. Bearings.

SRB
Single Row Double Row
ANNULAR BALL BEARINGS

THE many times multiplied volume of production being achieved for S. R. B. Bearings has been with adherence to the long established S. R. B. ideals — to produce the most dependable of all bearings, correct in design, correct in mechanical precision and correct in quality of steel.

The ability of S. R. B. Bearings to stand up under the severest load-carrying conditions and to render the longest and most dependable service has given them preference among successful automotive engineers.

You will find S. R. B. Bearings in those motor cars, trucks and tractors whose names are instantly thought of as leaders in their respective fields. The same is rapidly becoming true as regards the leading makes of high speed industrial equipment, machines and motors.



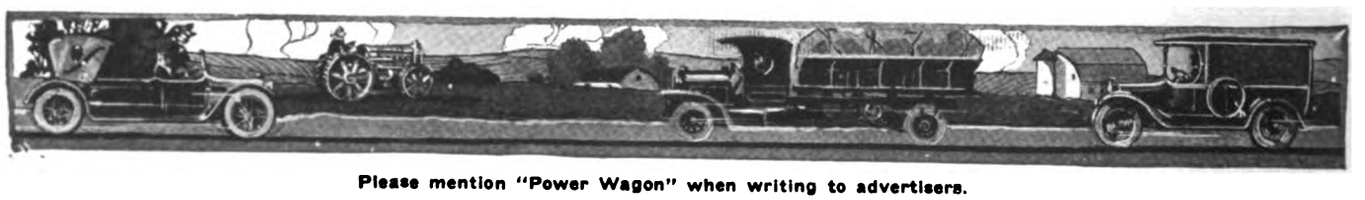
STANDARD
STEEL AND BEARINGS
Incorporated

Philadelphia — Standard Roller Bearing Co. — Plainville, Conn. Norwich, Conn.
Pittsburgh — Braeburn Steel Co. — New Haven, Conn.

Standard Sales and Service Distributors in Principal Cities

Executive Offices:
347 MADISON AVENUE NEW YORK CITY

Controlled and Operated by
MARLIN-ROCKWELL
CORPORATION



Please mention "Power Wagon" when writing to advertisers.

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Ship by PATRIOT

Patriot Motor Trucks were designed for use in districts where good roads are scarce.

They are built to conquer steep, slippery hills; boggy lowland roads; clinging clay; clogging gumbo and dragging sand.

The result is that every Patriot Truck gives matchless efficiency and economy on good roads and pavements.

Owners most appreciate the sterling worth of the Patriot Truck when they *do* face a hard climb with a heavy load; when they *do* find a stretch of bottomless mud, when they *have* to make the trip in weather that means impassable roads to trucks of less ability than the Patriot.

The Patriot franchise is one of the most valuable a progressive dealer can own. Wire or write for details.

HEBB MOTORS COMPANY

Manufacturers

1419 P STREET LINCOLN, NEB.

Revere Model	Lincoln Model	Washington Model
1500 to 2500 lbs. Capacity	3000 to 2500 lbs. Capacity	5000 to 7500 lbs. Capacity

PATRIOT

MOTOR TRUCKS

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An actual photograph of the two motor trucks, No. 134 (right) and No. 135 (left), which were used in the test of solid versus pneumatic truck tires described on the opposite page

Copyright 1920, by The Goodyear Tire & Rubber Co.

GOODYEAR

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Truck Dealers: Sell Pneumatics —Pneumatics Sell Trucks

A TEST of solid vs. pneumatic truck tires was conducted in the winter, spring and summer of last year by a corporation operating a very large motor delivery fleet. Two trucks had been used—No. 134, shod with solid tires on the rear wheels; No. 135, shod with pneumatic tires on the rear wheels. Both were equipped with pneumatics on the front wheels. Nevertheless, the difference in the rear-tire equipment was sufficient to produce the following wide difference in results:

	Truck No. 134 (Solid tires rear, pneumatic tires front)	Truck No. 135 (Pneumatic tires on all four wheels)	Difference in favor of All-Pneumatic equipment
Number of days operated	129.5	129.5	
Delivery or pickup stops	4,183	5,822	39% More customers served
Total units (pounds)	874,791	989,065	13% More product hauled
Miles traveled	4,476	6,414	43% More distance covered
Gallons of Gasoline	1,125	1,110	45% Less fuel per mile
Pints of Cylinder Oil	605	494	76% Less cylinder oil per mile
Drivers' and Helpers' Wages	$1,375.15	$1,512.82	23% Less labor cost per mile

NOTE: These results have caused the corporation mentioned to decide to adopt pneumatic truck tires for its delivery work over an entire state.

TESTS like this demonstrate the greater efficiency and economy of motor trucks released from the restraining effects of solid tires by the traction, cushioning and spryness of pneumatic tires.

Much evidence of the kind has led many motor truck dealers to sell pneumatic truck tires, since these intensify the advantages and therefore increase the sales of motor trucks.

Truck dealers can obtain the operating and cost data of similar tests, for selling purposes, by writing to The Goodyear Tire & Rubber Company, Akron, Ohio.

Haul on Pneumatics

CORD TIRES

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These Autocars are working on top of a 180-foot cliff at the John T. Dyer trap rock quarry, Birdsboro, Pa. They haul daily 600 yards of clay on a ledge only 20 feet wide. Other Autocars are working for this same company. Each one hauls on an average daily 200 tons of stone to the crusher; a round trip of half a mile. In January, 1920, John T. Dyer Quarry Co. added two more Autocars to their fleet

Because of their short wheelbase Autocars get in and out anywhere

Hundreds of contractors and road builders have found that the Autocar Motor Truck exactly meets the difficult hauling conditions of their work.

Because of its short wheelbase, the Autocar gets in and out of cramped quarters with a minimum of backing and maneuvering.

The reasonable first cost of the Autocar, and its ability to stand up under the wear and tear of contractors' work, make it a most economical unit.

Chassis (1½-2 Ton)
$2300, 97-inch Wheelbase
$2400, 120-inch Wheelbase

Among the thousands of concerns in every line that are using Autocars are many road builders, contractors and supply houses—we have listed them in a new booklet. Write us for a copy.

THE AUTOCAR COMPANY, *Ardmore, Pa.* Established 1897

The Autocar Sales and Service Company

Boston	New York	Philadelphia	Chicago	Pittsburgh	San Francisco
Providence	Brooklyn	Allentown	St. Louis	Los Angeles	San Diego
Worcester	Bronx	Wilmington	Baltimore	Stockton	Sacramento
Springfield	Newark	Atlantic City	Washington	Oakland	Fresno
New Haven					San José

Represented by these Factory Branches, with Dealers in other cities

Autocar

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POWER WAGON

Vol XXIV. CHICAGO, APRIL, 1920. No. 185

National Owner's Body Would Control Trucking

SEEKS TO TAKE OVER PRIVATE FLEETS

The birth of the Motor Truck Owners' Association of North America, of which Tom Snyder, of Indianapolis, is to be the general secretary, has been retarded by a controversy which arose when the organization stated its aims. Mr. Snyder's original idea was to weld into one national or international organization the numerous state associations which now exist. The state bodies were naturally inquisitive on the score of the purposes of the Motor Truck Owners' Association of North America, and the announcement of its plans has caused a division of opinion which has not yet been settled.

Mr. Snyder's plans are to make the Motor Truck Owners' Association of North America an organization of industrial or custom motor truck operators, and not to include big corporations which operate their own fleets. In fact, the ultimate

(*Continued on page 19.*)

American Makers Ask That Tariff Bars Be Lowered to Foreign Cars

For an industry to ask the government to lower the import duty against its foreign competitors is unique if not unparalleled, yet such is the position of the automobile manufacturers as announced by the National Automobile Chamber of Commerce, at the headquarters in New York. A canvass of 123 member companies resulted unanimously in favor of the reduction of the tariff on imported cars costing $2000 or over from 45 per centum to 30 per centum as now imposed on cars of lower value.

Herschell-Spillman to Enlarge Capacity to 100,000 Engines Yearly

The Herschell-Spillman Motor Company, of North Tonawanda, New York, announces that quantity production of its new Model 11,000 3¼ by 5 six-cylinder engine is well under way and that deliveries began the early part of March. The management explains that the above model is the result of demands made upon it by a number of the more responsible automobile manufacturers for a light weight, 6-cylinder engine capable of producing 60 horse-power.

Since the re-organization of the Herschell-Spillman Company about a year ago the progress made has been rapid. The demand for the firm's Model 7000 3½ by 5 four-cylinder engine, and the new Model 11,000 3¼ by 5 six-cylinder engine, has necessitated the elimination of all other sizes and types, or in other words, the product of the company is now confined exclusively to the two models mentioned, which have been adopted by more than forty responsible passenger car and light motor truck manufacturers and call forth a manufacturing program requiring a minimum of 60,000 engines for delivery prior to December 31, 1920.

To assist in the fulfillment of this schedule a large concrete, steel and brick addition, four stories in heighth, 70 feet wide and 160 feet long has just recently been completed and new machinery of the most modern design and construction, valued at more than $500,000, is being installed as rapidly as possible so that the daily combined production of the two engines referred to will, within the next few weeks, amount to over 200 engines, or an annual output valued at more than $10,000,000. A contract has been let for a second addition involving an outlay of $175,000 without its complement of tools and machinery. This second addition will be sufficient to permit of increasing the yearly output by 40,000 engines, thus bringing the yearly total up to 100,000 engines.

Hercules Company Expands

The capital stock of the Hercules Motor Manufacturing Company, Canton, Ohio, has been raised from $800,000 to $1,500,000, all common stock, to permit the carrying out of plans for greatly increased production. A separate company known as the Motor Castings Company has recently been formed to furnish castings for Hercules engines.

The following officers were elected J. G. Obermier, president; Gordon M. Mather, vice president; Charles Balough, secretary, treasurer and general manager; H. H. Timken, chairman of board; Rathburn Fuller, R. W. Gallagher and Austin Lynch, members of board of directors.

German Imported Trucks

It is stated that twenty heavy German lorries have been sold in England at $3,750 each.

American-La France Co. to Build Motor Trucks

NEW LINE WILL CONSIST OF 4 MODELS

An announcement of interest to the motor trade is that the American-La France Fire Engine Company has entered the field of the manufacture of commercial motor trucks. The American-La France Company is the largest builder of fire department apparatus in the world. The company is now completing its first series of motor trucks in its plant at Elmira, New York. These types comprise the following sizes 5, 3½, 2½ and 1½-tons—but for the permanent production of its commercial motor trucks the company has acquired a tract of more than twenty-three acres in Bloomfield, New Jersey, near Newark, on which a modern plant is now being erected, and which it is expected will be in active operation this summer.

Since 1845, the American-La France Fire Engine Company has been actively engaged

(*Continued on page 24.*)

Bailey Succeeds Skinner

The International Motor Company has announced the appointment of H. C. Bailey as advertising manager to take the place of D. O. Skinner, who recently resigned.

Mr. Bailey has been with the company for a number of years and although a native of Philadelphia, his activities have been centered principally in Chicago and St. Louis. His wide experience in selling, sales managing, advertising and editing has particularly fitted him for the position.

Road Bids Are High

Cook County, Illinois, soon will begin construction of about fifty miles of good roads under specifications compiled by the State Highway Commission. Instead of the $52,000 a mile asked in some recent bids, indications are the work will be done for $10,000 to $12,000 less. The county has advertised for the sale of $2,000,000 in road bonds, in the denomination of $1,000 each.

It has been intimated contractors expect to allow for a prospective 25 per cent advance in freight rates, but it is believed such advance will not be sanctioned by the Interstate Commerce Commission in time to permit it to affect the road building. It originally was planned to construct seventy-one miles this year.

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Price Guarantee Confab Billed for Mid-Summer

FEDERAL TRADE COMMISSION NOT READY

WASHINGTON, D. C., March 24.—Officials of the Federal Trade Commission inform the POWER WAGON that it will probably be midsummer before they are ready to call the general conference of all parties of interest to discuss the moot question of whether or not price guarantee clauses in contracts and the various form of guarantee against decline should be declared illegal and in restraint of trade. This conference at which all forms of price insurance (as given by manufacturers to distributers) are to go on trial for their life will be of direct significance to motor truck and allied interests, but officials of the trade body predict that should any market convulsion ensue between now and midsummer it will be likely that the sentiment of motor truck men, as heretofore recorded, may undergo a change.

That the round table conference of the propriety of guaranteeing against decline is to occur on a later date than had been contemplated is due to the slow rate at which there is drifting into the offices of the trade commission the data which is to form the basis of the coming deliberation. The trade body invited not only motor truck interests but manufacturers, merchants and ultimate consumers in other fields to communicate opinions on this commercial practice which has grown in popularity so remarkably since the war and to furnish evidence of actual experiences that might shed light on the debated question. This information is being received but it is coming in slowly and it is more voluminous than was anticipated, many new angles of the guaranty system being revealed. Your correspondent learns that when this issue comes to a show-down the business censor will devote special attention to the question of the propriety of a builder or manufacturer, in effect, retaining an interest in has wares, via a guarantee after title has passed. Another aspect of the proposition which has begotten wide differences of opinion has to do with the duration of a guarantee. This is a tender subject in industries such as the motor truck trade where the favorite form of guarantee is that given by a seller against "own decline," that is, against a subsequent lowering of his list price.

Garage Men Made Deputy Sheriffs To Aid in Apprehending Thieves

Owners of garages in some sections of Illinois are being appointed deputy sheriffs with a view of apprehending automobile thieves. Sheriff John C. Hayes of Stephenson county was the first to adopt this plan and it is spreading to other counties. In the past, garage owners, when their attention was called to something suspicious about a car or the driver, have been unable to act in most instances until after the car has been driven away, too late to accomplish any results. By appointing the proprietor a deputy without pay, he will be able to detain the car and driver until a proper investigation can be made. It is believed that this system will have a tendency to reduce the number of car thefts and also lead to the apprehension of many criminals and the recovery of numerous cars.

Considers Joining International Association of Road Engineers

WASHINGTON, D. C., March 17.—That the United States should accept the invitation of foreign countries to join the Permanent International Association of Road Congresses is the recommendation of the executive committee of the American Association of State Highway Officials to the Secretary of Agriculture. The committee which recently concluded a two-day conference here considered, at the suggestion of Secretary Meredith, the invitation to the United States which had been received through the State Department from the American Consul General at Paris. Secretary Meredith concurred in the action of the highway officials and told them he would recommend to the State Department that congress be asked to authorize acceptance. The highway officials also recommended that the international association be invited to the United States for its next meeting.

Postal Service Has Potential Capacity to Feed 60,000,000

That the postal department has its eye on the revenue that could be produced by a net work of rural postal routes is proved by figures taken from the post-office records. There are 60,000 employes of the postal service who traverse 1,400,000 miles of highways, through producing territory in this country every day. If each individual carrier would transport 2,000 pounds, the total transported would amount to 120,000,000 pounds daily. The average consumption per man, woman, and child, is about two pounds per day, this quantity would feed approximately 60,000,000 people, or two-thirds of our entire population.

One of the many instances where the post-office department saved money for the consumer through its rural motor truck service, is credited to the East. On November 12, 1919, 86 crates of eggs, 2,580 dozen, were shipped on a motor truck from Warsaw, Virginia, to Washington, D. C., a distance of 135 miles. The postal patrons or consumers paid 1,625.40 for this produce, which would have cost them at the lowest price prevailing in the city on that day $2,012.40, or a net saving of $387.00. The postal revenue was $54.18.

Covert Enlarges

The Covert Gear Company, of Lockport, New York, is building a three-story concrete and brick factory building costing $270,000. The new building is located at the corner of Lock and Grand Streets near the ones already in use. It will be devoted to the making of gears and will increase the capacity of the plant 40 per centum.

States Draw Lightly On Millions in Road Fund

CLAIM $14,000,000 OF FEDERAL-AID MONEY

WASHINGTON, D. C., March 22.—No new national appropriations for highway construction or improvement, because no additional funds are needed at this time. This, in a sentence, chronicles the situation in Congress as it has finally revealed itself. Recent rumors from Washington to the effect that the national legislature had shut down on allotments of funds for highway improvements have, evidently, caused widespread misgivings on the part of many interests in the motor truck industry and kindred lines. However, there is, in reality, no cause for pessimism or misgivings. The false alarm to the effect that congress had lost its enthusiasm for nation-wide good roads, built to stand up under motor truck traffic, has resulted wholly from a misunderstanding.

It is quite true that congress, confronted by the nightmare of heavier taxes or another bond issue, is making strenuous efforts to economize, at least in spots. However, there is no relation, as has been assumed, between that fact and the circumstance that the congressional leaders have virtually decided that this congress will make no further appropriation of funds to be "matched" by the several states for coöperative road work. This latter decision was due to the discovery that there is already available more money for federal-state joint road work than will be used during the next few years.

Under the road improvement program heretofore authorized by congress there is available a grand total of about $275,000,000 for highway construction which the several states are disposed to undertake on a share and share alike basis. According to the latest available figures only about $14,000,000 has thus far been drawn against this fund. That does not mean that the states have actually done so little as that under the authorization, because in some states road work has been pushed ahead without the officials collecting from the government as they proceeded. However, a liberal estimate places at not to exceed $50,000,000 the allotments due from this fund for work thus far actually performed. Consequently public officials, road builders and association executives in the motor truck industry have all agreed that, even with the states pushing road construction operations as energetically as could possibly be expected, there are funds on hand to carry the project for several years to come. Inasmuch as the funds already appropriated by congress are available up to the year 1923 there has been, on the part of all road building and motor truck interests, a concurrence in the opinion that no addition to the highway development fund is necessary at this sitting of congress.

Merchants in the Province of Seville Spain, have subscribed for $250,000 worth of American motor trucks.

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National Defense Council May Make Truck Survey

ACTION DEPENDS ON CONGRESSIONAL PURSE

WASHINGTON, D. C., March 22.—The United States Council of National Defense, having been given a new lease of life, will push its plan for mobilizing the motor transport resources of the nation. The council has funds that will allow it to operate until July 1 of this year and encouragement is held out that congress will set aside the necessary appropriation to keep the institution in operation for a full year after that date. Meanwhile, steps are being taken to launch in earnest an intimate survey of the privately owned motor trucks in the United States that would be available for use in any emergency—in the face, say, of a general railroad strike no less than in a military crisis.

When in December, 1919, the director of the Council of National Defense, acting by authority of the Secretary of War, wrote to every state governor requesting that he take steps for mobilizing the motor transport resources within his state, the move was in a sense a "feeler" of sentiment within the states. It was realized that this mustering of motor trucks for emergency service is primarily a state function and the national council desired to avoid anything that would savor of paternalism. Now, however, that the state officials have responded in a spirit of whole-hearted coöperation there is to be carried out without delay the task of compiling a national census of the nation's privately owned motor trucks. Governors who have forwarded to Washington data of limited scope will be asked to supplement the information in order that the council may have complete statistics, and governors who have indicated a willingness to gather information but have not yet done so will be requested to proceed with their census work.

The Council of National Defense will seek to assemble all the statistical data needed to reflect the potentialities of the motor truck fleet—that is, figures covering character and capacity of motor trucks, horse-power ratings, tire requirements, etc. —but will not attempt to compile a national directory of the names and addresses of individual motor truck owners. It will be suggested that all states have ready for reference these detailed data on motor truck ownership—indeed, many of the states already have it—but it is felt that it would make the records at Washington unwieldy to undertake to keep on file the records of ownership and operation.

One matter of undoubted importance that it is planned to take up with the respective governors in April is that of arrangements for the mobilization of motor trucks in the event of sudden summons to service. It is felt that there should be worked out in each state, by those having intimate knowledge of state highways and other influencing conditions, a plan for the mobilization of motor trucks at one central point or several strategic points within the state. This recommendation will be brought to the attention of the state executives and it will be requested that copies of mobilization plans be placed, when completed, on file at Washington together with estimates of the time required for all motor trucks to reach each assigned rendezvous.

National Owner's Body

(*Continued from page* 17.)

aim is to absorb these fleets. And that this is not a dream is being proved almost daily by the Indiana Transfer & Warehousemen's Association, of which Mr. Snyder is the secretary.

As an example, the Indiana association has induced several concerns which have operated one or two motor trucks of their own, to sell the machines, or turn them over on some other basis, to the organization, which agrees to do all of the companies' trucking. This is an illustration on a small scale of the plans of the Motor Truck Owners' Association of North America.

Here is an example on a somewhat more ambitious plane. The Indiana association is now negotiating with an association of wholesale grocers in Indianapolis, whereby the latter are to give up their individual motor trucks and rely altogether on the transfer men for their transportation. The argument is advanced by Mr. Snyder and his associates that transportation is a business, and a big one, in itself, and that grocers, for example, would find it more profitable to devote all of their energies to their groceries, than to divide their supervision between the grocery and the transportation business, or even to create a transportation department to direct that work. The grocers were told that, inasmuch as transportation is an industry in itself, the most efficient and economical method of handling the transportation question would be to rely on men who devote all of their time and thought to it. This argument, it is understood, was favorably received by the wholesalers, and the deal is expected to be closed in the immediate future.

It is proposed to call a general meeting of the Motor Truck Owners' Association of North America at Philadelphia on June 23 and 24. All the existing state and local organizations, it is expected, will be represented at this gathering. In the meantime, Mr. Snyder is making an effort to bring harmony into the ranks, with indications that radical changes in the make-up of the state organizations will be necessary before this can be accomplished.

The Pennsylvania Motor Truck Owners' Protective Association, which has its headquarters in Philadelphia, is one such organization. This association is comprised not only of custom motor truck operators, but of such concerns as the Curtis Publishing Company, which operates fleets of its own which in size dominate the equipment of the average industrial operator. The view is taken that it is impracticable to have in the state bodies opposing forces, such as those indicated, or at least, to fuse all such organizations into one national body with any cohesion and unanimity of purpose. The question arises as to whether the Pennsylvania association will elect to stay out of the Motor Truck Owners' Association of North America, eject the members who are not custom motor truck operators if it decides to affiliate, or merely organize a separate association including custom owners exclusively. This question in regard to Pennsylvania probably will be answered on April 7, when Mr. Snyder will speak at a meeting at Philadelphia, explaining his views in detail.

Mr. Snyder described the situation as follows to the writer:

"An organization composed of some owners operating for themselves and other owners operating for others will get nowhere. It is said that the interests of capital and labor are the same, but they are not. They are diametrically opposed. The same thing is true to a great extent of motor truck owners of each kind. If the custom operators found it necessary to ask for higher rates, for instance, those operating their own machines for their own businesses probably would oppose the increase."

The California State Draymen's Association, of which C. R. Collins is secretary-manager, has indicated that unless the Motor Truck Owners' Association of North America is made up solely of custom operators, the California men will not be interested. Others have taken the same view. Mr. Snyder hopes to reconcile the various interests before the June meeting.

41,057 Motor Trucks at Work in New York City

REGISTRATION INCREASES 29 PER CENT

ALBANY, MARCH 21.—The official automobile registration figures just made public by Secretary of State Hugo shows that New York state has a total of 571,662 motor vehicles, representing a 23 per centum gain over 1918. Its pleasure cars increased from 365,874 to 446,593 during the same period, a 22 per centum increase. The greatest percentage of increase, however, is shown in the commercial types, the Empire State last year registering 97,346, or 22,037 over 1918. This amounts to 29 per centum. New York state has 2,681 automobile dealers, an increase of 629 for the year, its chauffeurs numbering 181,632, a 23 per centum increase. Motorcycles show a falling off of 36 for the year, the registration being 28,561.

Of the total cars in the state, New York City can claim 178,441, of which 126,750 are pleasure and 41,057 are commercials. The metropolitan dealers number 820, while 107,824 chauffeurs are included in the New York City boroughs. The Empire State has a car to every 16 inhabitants, while in some of the counties, the ratio is one to every eight persons. Secretary of State Hugo is predicting a million cars for New York state four years hence.

One automobile stage line operating out of Los Angeles, Cal., has sixty-seven buses and carries over 800 passengers daily.

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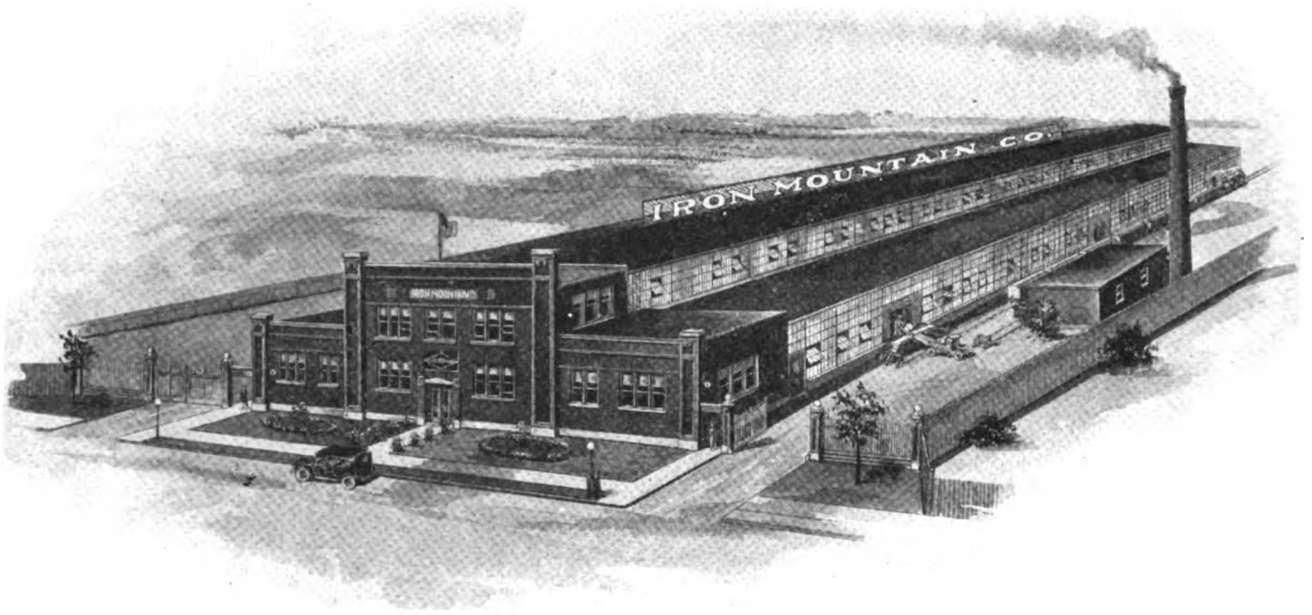

IRON MOUNTAIN CO.

Worm Drive Axles

Built in a new, modern axle plant, conveniently located in Chicago's steel and iron manufacturing district, where every facility for the prompt supply of necessary axle material is at hand.

Truck builders will get dependable axle service from us, coupled with a product which embodies the latest and best engineering practice in rear axles.

IRON MOUNTAIN CO.

927 East Ninety-Fifth Street Chicago, Illinois

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POWER WAGON

An exponent of the most enlightened thought and practice of the motor truck industry.

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THE POWER WAGON PUBLISHING COMPANY

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Market Opportunities

TO SOME men is given the happy faculty of clear vision and to them also, should their talents be exerted in business, comes most often the much sought prize, success. Yet what passes for vision is some times no more than the wildest passion for guessing and it stops neither at the age of man nor at the distance of doom. A great deal of such dreaming has been wasted on the motor truck industry to the amusement or profit of the guessers and to the discomfiture and cost of the credulous. Of both classes of persons there have been a great many, as in all young and rapidly developing trades.

The potential market for motor trucks, whether in the country at large, in selected portions of it or in selected industries, has been the center of the most extravagant speculation on the part of those who, because of their position or supposed knowledge, are expected to speak authoritatively on a subject with respect to which gross ignorance prevails. We are ready, as always, to admit the utility, and even the expediency, of "boom" statistics, but we have never been convinced that the resultant misconceptions do not more than counterbalance the good effects. We have seen many producers and sellers deluded, some to the point of financial ruin, by the baseless, yet apparently reliable and sincere, estimates of market possibilities which have found such ready acceptance in this industry.

We hope no one cherishes the illusion that the extent of this trade's market can be accurately determined, for such an accomplishment, however imperative and valuable, is, we need scarcely remark, beyond the pale of possibility. It seems advisable, however, that some attempt should be made to estimate as closely as possible just what this trade's opportunities are or may be. Many impatient investigators have dabbled in meager statistics and brought forth an impressive array of facts and fancies which has been able, from sheer volume alone, to bewilder even the most cautions. Unable to discover the truth these delvers after ready-made knowledge have not hesitated to invent it, and we pay every day the price of our acceptance and approval of such methods. There is apparent everywhere, nevertheless, growing dissatisfaction with the practices of those who do not scruple to delude when private interests so dictate, and there is likewise a growing realization that the highly important work of estimating market possibilities should be left in the hands of those who will discharge with conscientious care the obligation that rests upon them.

The trade should not be content with any poorly conceived notion of what intelligent research is. It should insist upon a carefully thought out program of investigation, planned and executed by experts who will have no interest in seeking anything but the truth so far as that may be ascertainable. From such hands it is quite possible that within a short time we should know something of genuine value concerning the opportunities in this industry. In any event, we should certainly be able to find at least a dozen men who would speak of market possibilities in intelligent, understandable and similar terms.

The Old Order Changeth

THE anti-motor propaganda instigated by the Horse Publicity Association, which promised to provide a fund of $500,000 for the purpose, has begun to filter through the country and evidences of the wide distribution given it are supplied almost daily. The spirit which showed itself so confidently several years ago, through the encouragement and stimulation of the *Team Owners' Review* and other horse-owning and horse-breeding agencies has been revived, and scarcely a single agency, from the *Breeders' Gazette* to the *Harness Makers' Review*, has been overlooked in the effort to utilize to the utmost the available organs of public opinion. The public press, always on the lookout for news and never particularly anxious to weigh its truthfulness or commercial influences, has been contributing its share, and indeed it may not be long before the motor truck salesman will find his "prospect's" desk littered with horse propaganda instead of motor wagon facts.

There is, as a general thing, no cause for great alarm over a movement which may hold public attention only temporarily and which will probably expire as suddenly as it was brought to life, but there should be some concern over the fact that the sinister influences of its propaganda are being brought to bear on the most fertile soil at hand, the present horse owner. We should not be content with knowing that most horse publicity is filled with innuendoes and all known forms of literary chicanery, some of them grossly obvious on the most casual perusal, for a great deal of it is very artfully phrased in its sentimental appeal and it is often wrapped in an atmosphere of feigned ingenousness which completely captivates the undiscriminating reader. Some of its most subtle claims are purposely given the appearance of disinterestedness through such insidious means as letters to editors written over the signatures of undiscoverable nonentities. Counter propaganda is the surest and most effective means of combating the forces now at work in the interest of the horse exploiters and we are pleased to observe that, even in the absence of any specially planned campaign and without any specially prepared publicity, casual daily accounts of the happenings in the realm of commercial transport are supplying a genuine and powerful antidote.

Thus, Dr. Rommel, of the United States Department

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of Agriculture, says that we may look for higher prices to be asked for horses because the farmer can not be expected to devote five years to raising a $500 horse when he can raise a $200 hog or lamb in nine months and a $200 steer in less than three years. Another farm adviser, this time from Illinos, tells us that better types of horses are needed and that there are too many mifits in our horse production. The tax collector of San Francisco reports a 60 per centum decrease in the number of horse-drawn vehicles in that city since 1916, while business motor vehicles have increased nearly 300 per centum in the same time. In five years, say local observers, there will not be a business horse on the city's streets. Denver, we are now told, is considering legislation designed to prohibit the use of horses within its corporate limits, and in Pittsburgh there is talk of barring them from the congested business district. And as a note of scientific interest we offer the following news just cabled from England:

"The last fire-engine horse in the London Fire Brigade has now been withdrawn from service. It has been offered to the Science Museum at South Kensington."

Census of Truck Use

IN company with a large portion of the manufacturing and distributing branches of the motor truck industry we have often deplored the lack of reliable statistics concerning the extent of this trade, particularly with respect to the use of motor trucks and the chance for determining with reasonable accuracy its future opportunities. We have had no little experience in this work ourselves and can, therefore, well understand the reluctance with which the subject is approached by those who might be made candidates for the task. This does not lessen, however, our conviction that there are only a few more important problems than that of measuring the business out of which we all live.

There is now some prospect that a beginning in this direction will be made, for the Council of National Defense proposes, if it is given a renewed lease on life through congressional assistance, to undertake the collection and compilation of such data as would be of material aid in arriving at the knowledge so much desired. Plans as already formulated do not provide for more than an enumeration of the machines in use, but even an incomplete program, such as this one undoubtedly is, should be encouraged and supported in the hope that the spirit in which it is born will bring forth more mature ideas under proper stimulation. The motive which prompts the council to embrace its ambitious program has not been conceived in any selfish interest but rather with an eye to the public welfare. It is the belief that the information now sought will be of great help in relieving emergency conditions which might follow the sudden cessation of any basic industry or the interruption of national transportation facilities.

It may be doubted whether the Council of National Defense is the proper agency for work of this kind, although its advantages are apparent. The task of census taking as applied to the motor truck industry might perhaps receive better attention in the hands of some trade organization, such as the National Automobile Chamber of Commerce; in fact, we have always contended for this viewpoint. There one would quite naturally expect to find a keener interest in the kind of information required and a more sympathetic understanding of its uses in an industrial way. The council, however, would possess the important advantage of having its work certified by the authority of government which would greatly facilitate the prosecution of any investigations undertaken. Possibly a combination of aim and effort might be effected whereby this industry's leading organization could devise the program, leaving its execution and the custody of its results in the hands of a federal agency with the understanding that the statistics collected be made available for the enlightenment of the motor wagon trade. The industry would, we believe, gladly welcome an arrangement which would bring an accurate knowledge of this kind of commercial information within the reach of all.

Truck Markets Abroad

EVERY week provides new evidence of the growing interest abroad in American-made automotive appliances, and the demand for our motor transport equipment comes from many quarters. Within the past month we have received inquiries from more than half a dozen different countries ranging from Scotland to New Zealand and from Russia to Brazil. This industry has never disclosed much wholesome interest in foreign business of a commercial nature, nor is it likely to at this time when factories are hard pressed for deliveries to meet the unprecedented demands of American industry. But as domestic production approaches domestic demand we may be expected to turn a willing ear to the call of foreign commerce.

New Zealand, we learn, is very prosperous after a long war period of high prices for the products of basic industries and holds out flattering inducements to American wares. With a population of about 1,000,000, largely natives, it uses more motor trucks than the city of San Francisco, which has a much larger commerce. In the Seville district of Spain local merchants have subscribed a fund of $250,000 for the purchase of American motor trucks, and an equal amount will be provided later. Orders for 100 American machines have already been placed but deliveries have been greatly delayed. Motor trucks in use in Norway have increased in number at least 50 per centum in the last year and in such cities as Christiania they are almost as numerous as passenger-cars. Public motor transport is rapidly increasing and nearly 600 motor bus routes are now regularly traversed. Similar news comes from Brazil, Scotland, British South Africa and other points. In Russia there is crying need for motor transport to assist the people in getting back to a sound economic basis and the present government has $50,000,000 in gold ready for foreign goods whenever we decide to lift our stupid blockade.

American production lags far behind domestic demand, but this is not a permanent condition. Meanwhile the commercial world stands ready to buy the output of our factories and offers, in all the cases named, to make satisfactory terms. The entire civilized world is in need of more motor transport and is able, except for a few of the nations torn by the war, to pay cash. The next twelve months hold a great future for our export business the very moment we are able to care for the demands of a prosperous and active domestic market.

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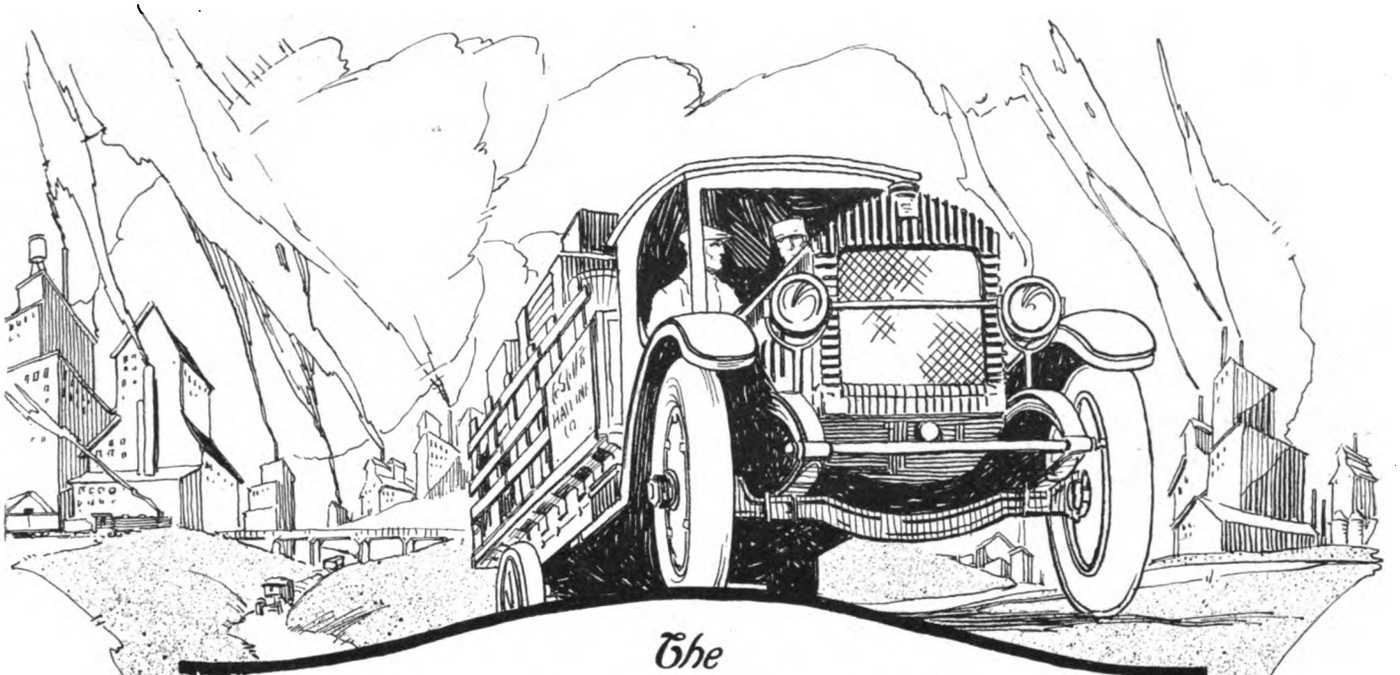


The

Handiwork of Master Artisans

In the ancient guilds the master artisans were guided by the principle of perfection. They labored skillfully and wrought the marvelous lace, silk, gold and marble that has caused the modern world to wonder.

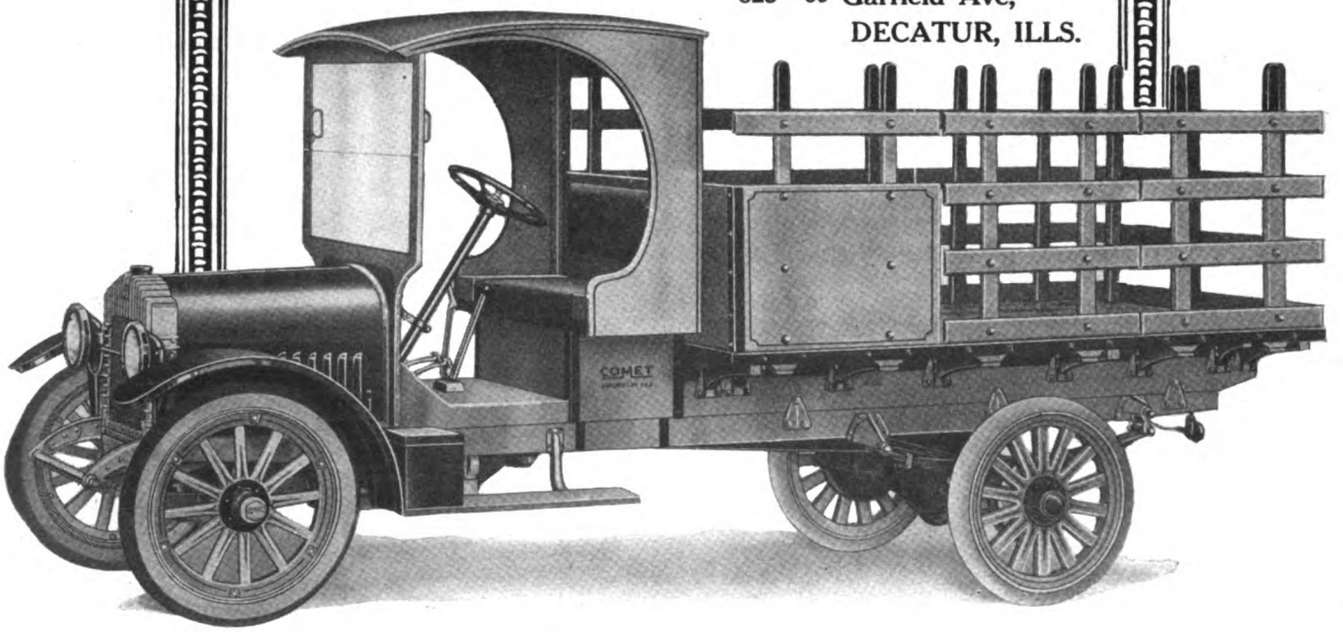
'Tis only seldom that the spirit of the ancient master-craftsmen is manifest today. But when it is, their handiwork is the modern miracle. They create products that all the world demands.

One place where you will find that perfection as the guiding principle is the COMET factory. And everywhere the Comet Truck has gone its achievements have heralded the work of master artisans.

DEALERS who are interested in a 1½-Ton Truck will find the COMET profitable. Address

COMET AUTOMOBILE COMPANY,

823—69 Garfield Ave,
DECATUR, ILLS.



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New British Motor Taxes Are Based on Road Wear

SOME MACHINES CARRY OVER $400 BURDEN

The new taxes which, it is contemplated, will be levied on motor vehicles in the United Kingdom will be based on the principle of road wear and tear, according to a statement of the Ministry of Transport. The horsepower will be the unit for the calculation of the tax on private motor vehicles, their weight the unit of commercial motor vehicles, and their seating capacity for hackney carriages and omnibusses. Motor cycles will be taxed on their weight, with an extra amount for side car or trailer. Concerning the proposed taxes the *Sheffield Daily Telegraph* says:

The proposals, which we believe are likely to figure in the recommendations of the Motor Legislation Committee—a body advisory to the Ministry of Transport—are that private motor cars should be taxed $4.87 per unit of horsepower, with a minimum of $29.20; that commercial motor vehicles should be taxed according to their weight, and that the tax on hackney carriages and motor omnibusses should be based on their seating capacity. Motor cycles, including motor scooters and other motor-assisted cycles, if under 200 pounds in weight, will be taxed $7.27 each. Those over 200 pounds in weight will have to pay a tax of $14.60, and those with the right to draw a trailer or side car will be taxed $19.47.

As to the hackney vehicles, those with a seating capacity of 1 to 5 will be taxed $87.60, if in the Metropolitan area, and $73 in other districts; those carrying 6 to 12 passengers, $175.19; 13 to 18 passengers, $233.59; 19 to 24 passengers, $292; 25 to 30 passengers, $350.39; and those with a seating capacity exceeding 30, $408.79. These last-mentioned figures will be approximately 12 to 15 per centum less for districts out-side London.

Of commercial vehicles, it is estimated that there will be 1,000 motor cycles, and these will be taxed $14.60, and the 3,000 3-wheeler motors will each have to pay $19.47. The 30,000 commercial motor vehicles not exceeding 1-ton, unladen weight, will pay $77.86; the 12,000 vehicles exceeding 1-ton and not exceeding 2-tons, unladen weight, will each pay $102.20; the 20,000 vehicles exceeding 2-tons and not exceeding 3-tons, unladen weight, will pay 121.66; while the 15,000 vehicles of between 3 and 4-tons, unladen weight, will be taxed $136.26; and the 8,000 vehicles of over 4-tons, unladen weight, will have to bear an annual tax of $146.

It is estimated that there will be approximately 210,000 pleasure motor cars, and each of these will be taxed, as already stated, on the basis of $4.87 per unit of horsepower, with a minimum of $29.20.

There are a variety of other miscellaneous vehicles which will come within the scope of the new taxation proposals; for instance, the 10,000 commercial vehicles with the right to draw trailers, and for which a special tax of $24.33 may be imposed. The 2,000 motor tractors may not escape with less tax than $102.20. Road locomotives will, according to their weight, pay $121.66 to $146 each, while agricultural tractors used on roads for haulage will pay a $48.67 tax, although agricultural tractors not used for haulage may escape with but a nominal duty of few shillings.

American La France Co.

(*Continued from page* 17.)

in designing and building fire department apparatus, including steam fire engines, hook and ladder trucks, water towers, chemical engines, hose wagons, and other smaller types. Practically every large fire department in the United States is equipped with American-La France apparatus; also, many of the large departments in Europe and South America. Some twelve years ago, the company successfully placed on the market a full line of motor propelled fire department apparatus, the design of which was a difficult engineering feat, because of the fire service requirements.

The motor pumping engine not only had to be propelled to the fire at speeds exceeding the fastest passenger car, regardless of road conditions, the equipment of pump, hose and chemical tank being equivalent to the load carried on a 3½-ton motor truck, but upon its arrival at the fire, the same motor had to drive the pump, discharging up to 1200 gallons per minute, at high pressures, the machine often incased in ice formed from the spray from the fire streams, and run continuously without a moment's shut-down for hours, several runs having been recorded of more than fifty continuous hours.

Several fire department types have required special engineering thought, such, for instance, as the hook and ladder truck, which, because of its long wheel base—396 inches—making it necessary to steer the rear wheels, and also its equipment interfering with standard designs of driving mechanism, obliged the company to design a special 2-wheel front drive tractor in which the front wheels are steerable, and also propel or pull the truck.

This experience has developed a highly specialized engineering organization, covering almost every phase of road and load carrying problems as affecting the motor truck. In the design of its commercial motor truck, the company has followed the high standards employed in its fire apparatus along the most approved and modern designs adopted by the best motor truck builders. All parts are manufactured in its own plant and American-La France quality is built into every part, and it is believed that experienced users who demand sturdy, reliable construction and long life with minimum cost of up-keep and operation will find all of these qualities combined in American-La France motor trucks. The company has branch sales rooms and service stations in the following cities: Boston, New York, Philadelphia, Atlanta, Pittsburgh, Dallas, Chicago, Minneapolis, Denver, San Francisco, Los Angeles, Portland, Oregon, and Toronto, Canada.

California 'Buses Run 225,000 Miles Each Day

ONE COMPANY OPERATES SEVENTY CARS

California auto stage operators are making history in short haul passenger transportation, according to the Ride-by-Stage section of the Firestone Ship-by-Truck Bureau, which is authority for the statement that more than $1,500,000 has been invested recently in the big motor 'buses by business men in Los Angeles county alone, and that last summer more than 1500 of the stages were operating in the state, rolling up a mileage of 225,000 daily.

So far as can be learned the first company to operate auto stage lines in California started in business early in 1915, with a route between San Francisco and San Jose, a distance of 50 miles. At the beginning it had only 6 cars. To-day it is operating 27. Another company is operating 70 cars out of Stockton, while in Oakland it is estimated on good authority that 2500 passengers arrive and depart daily by auto stage.

It is very likely that California is taking the lead in this business because of her excellent system of hard-surfaced highways. If this is so the growth of the business there no doubt foretells its growth in other states as good roads become more general.

It is interesting to note that in California the stages are not replacing railroad service. They operate under a state franchise that is obtainable only by showing the state railroad commission that there is need of the motor 'bus service because of inadequate railroad service. It would appear, therefore, that the motor stage has a distinct and useful field.

Fire apparatus, because of the nature of its use, is liable to damage from accidents, which because of the importance of its service, must be repaired quickly. Therefore, the company has stationed in each of the above cities one or more experienced factory men and complete stocks of parts to enable it to render quick service. It is proposed to carry a full stock of motor truck parts in these service stations and equally prompt service will be at the command of its motor truck users.

Exports for January

The exports of motor vehicles of British manufacture for the month of January show, as might be expected in view of the moulders' strike, only a poor result as compared with what might have been the case. The number of vehicles despatched abroad during the month was 309, of a total value of 1,059,710; whilst the value of the motor-car parts shipped was $637,710, making a total of $1,697,420 as compared with $460,340 in the month of January, 1919; although, let it be remarked, the figure is just slightly better than that for the month of January, 1913.

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Truck Hauls 50,000 Feet Lumber 2⅛ Miles a Day

LUMBERMAN BUILDS OWN RAILROAD

In St. Stephens, Alabama, there is a lumberman named C. W. Stallworth. He operates a mill near the town, where he cuts yellow pine lumber in large quantities.

The timber is there, and in sufficient quantity to make it worth the while of any lumberman to go after, but transportation was the real problem. Horses, mules and oxen had to be forgotten—the country was so swampy that they simply could not haul the timber out from the mill to the Tombigbee River, down which it had to be rafted to market. A railroad was the only solution of the transportation problem, and even that would hardly turn the trick, because the cost of installing steel track, dummy locomotives and of constantly adding to the trackage as the mill and the base of operations were moved back further and further into the woods as the timber was cut promised to eat up all the profit.

A motor truck was suggested, but immediately the question of roads came up. How could they operate a motor truck to advantage when there were no roads, and where it would sink into the swamps? Corduroy roads would cost too much to build for this work, and the motor truck would not do—at least, so they thought.

Finally someone had a real idea. "Suppose," he said, "we build our own railroad, using slabs for cross-ties, four by 6 hardwood strips for rails, and a motor truck on flanged wheels for our power. Then we can hitch a trailer to the machine, load on our lumber, haul to the river bank and float it down as we want. We can extend the road in any direction at will, because the lumber we will use is what we now use for fire-wood. We will have the necessary power in the motor truck to handle properly heavy loads, and we can handle this job of lumbering at a substantial profit."

The longer they thought it over, the better and more feasible the idea appeared. So they built a railway. The construction is shown in accompanying photograph. First they laid slabs of wood for cross-ties, then nailed rough slabs to these, and on the rough slabs long strips of 4 by 6 hard wood were spiked. The road started at the mill and ended at the Tombigbee River bank. The total distance is 2⅛ miles. At each end is a turntable, made by mounting a worn-out circular saw upon a stump, making a frame the exact length of the motor truck and mounting this upon another old saw, which is a most unusual form of turntable, and which is so well balanced that one man can reverse the machine when empty.

Lumber road in South.

The mill has an output of 50,000 feet of yellow pine lumber per day, and the size of the timber hauled on the motor truck and trailer is apparent. Loads consisting of several timbers 18 inches square, and from 18 to 40 feet long, are hauled without difficulty up grades from 3 per cent to 18 per cent without shifting the gears, or without slowing down for curves in the road, and the motor truck can made 25 round trips a day with such loads without effort. The average speed is the governed speed of the motor truck, which is a United States model H, 2½-ton governed to 14.21 miles per hour.

Performance alone counts—the final result is what we are all interested in. The results in this particular case have been remarkable. The motor truck has been in service for one and one-half years, and has been well lubricated and tightened up by the driver, who must take care of his machine every night before he leaves the job. As a result, not one cent has been expended in up-keep or repairs, the motor truck has been on the job every day, all day, has made it possible for the owner to handle at a profit timber that might otherwise have been valueless because of the impossibility of handling it and getting it to market at reasonable cost, and it has handled that timber at a cost of less than $1.00 per thousand feet.

"By their works ye shall know them." It applies to motor trucks as well as to men.

English Pay High Prices for Gas Purchased in U. S. for 42 Cents

The wholesale price of gasolene has been advanced by 16 cents per gallon in England instead of 14 cents as previously reported. The British "imperial gallon" is one-fifth larger than the American gallon. At the present rate of exchange the cost per imperial gallon in the United States is 41 to 42 cents. The rate of exchange is said to represent an increase of 9 cents a gallon. Current freight rates represent 18 cents a gallon for gasolene transported from New York to the United Kingdom.

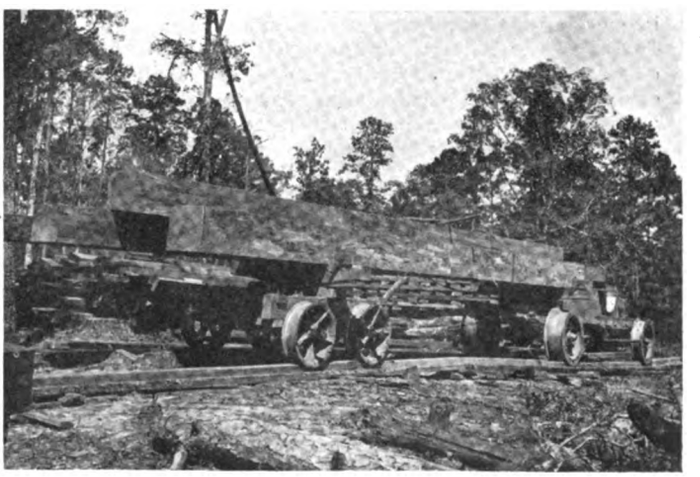
The following table indicates the manner in which the cost is made up, but it will be noted that one-half the present ocean freight rate is charged in anticipation of an ultimate fall in the rate of ocean carriage:

	Per gal.
Cost f. o. b. New York	$0.42
Ocean freight (taken at half current rates)	.09
Average cost of railway freight and distribution, as established by accountants	.14
Duty	.12
Garage profit	.09
	$0.86
Five per cent profit to distributers	.04
Total	$0.90

Paepper Chief Engineer

E. F. Paepper, formerly chief engineer of the Republic Motor Truck Company, and the All-American Truck Company, is now chief engineer of the Superior Motor Truck Company of Atlanta, Georgia.

Turntable in lumber camp.



Truck hauling heavy timbers.

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Farm Markets for Motor Trucks

By ARTHUR CAPPER
United States Senator From Kansas

ONE of the great developments of the next twenty-five years will be the motor truck on the farm. I am interested in it because it relates to the development of the great West and the great western industry—agriculture. In my own State of Kansas we have made much progress, or at least we have gone as rapidly as any other state in the West, in adopting the farm truck for agricultural purposes.

The motor truck manufacturing industry is not only important because of the extent of its physical and monetary resources, but also because more and more each day it is becoming essentially allied with the future development of the agricultural interests of America. The day of the power farmer is at hand. It is to him that we turn in answer to the world's cry for greater production. He alone can supply us with the necessities of life and assure our essential national integrity. But he must be given tools worthy of his task. The motor truck, because of its adaptability, flexibility and its endurance, is one of the chief requisites in any scheme of power farming. Let me set forth for a moment the present status of the farmer of America, and the position that he occupies in relation to the wealth and economic stability of America. And in indicating this position, I hope to indicate to you some of his present and future importance as a buyer and user of motor trucks.

FIFTY-TWO per centum of the population of the country is engaged in farming. Nearly seven billion dollars represents the investment in farms and their equipment, a sum that is equal to the total capital of any three other major industries that might be cited. These two sets of figures are quoted because they indicate roughly the tremendous potential market that is found among the farmers of America. Let me go further and point out that the average buying power of the American farmer has, during the past four years, increased from $1,600 to $3,400 a year, over 100 per centum, whereas the average buying power of the city man still remains, approximately, at $900 a year. Two-thirds of all farmers in America own their own homes. Contrast this with the knowledge that two-thirds of all city dwellers rent, and do not own their homes. Farming is a profession, and, despite many exceptions to the rule, a profession which is passed from father to son through many generations. In other words, there is a permanency both about the profession itself and about the men who follow it. The farmer is, therefore, a permanent citizen, a permanent power for good in the community in which he lives, and a permanent factor in any prognosis of any market for almost any product you might name.

The old idea of the farmer, gawky, obstinate, and frequently ignorant, living on corn pone, sow belly and molasses, in a sod house or timber shack scarcely better than the building which houses his cattle and hogs, has gone forever. The farmer is an exceedingly intelligent individual whose exacting profession demands a large amount of both technical and practical knowledge. The same skill and judgment that enables the Middle-Western farmer, for example, to produce the best corn, wheat, cattle, and hogs in the world, also enables him to buy with discrimination. He is no "piker." A man with an investment ranging from $5,000 to $100,000 put into a farm, may properly be called a business man. The farmer is a business man and buys as one. For such a man, any reputable product carries its own appeal.

WHAT I have said about the American farmer in general is even more true of his local Middle-Western brother. In a group of 16 states situated on the great alluvial plains of the Mississippi and its tributaries, is found a population of about three million farmers who together raise more than one-half the beef cattle in the country, more than one-fourth of all dairy cattle, three-fourths of all horses, and mules, three-fifths of swine, three-fourths of all wheat, two-thirds of the corn crop, and the entire milo and kafir production. In this enumeration, I have not mentioned such incidentals as the various hays, alfalfa and fruits. I have not counted farmers' oil leases, which though not a crop, certainly contribute to the farmers' buying power. We therefore, have 16 states, one-third the total number of states in the Union, producing on an average two-thirds of all the agricultural wealth of the nation.

But before considering in any greater detail the possibilities of the farm market, I wish to register here my emphatic opinion that conditions may soon arise—in fact, are already in existence—that will seriously limit this market unless stringent steps are taken to protect the farmer and to assure him a decent return on his investment. The farmer's productive power is the measure of his absorptive power as a buyer of any commodity. As a matter of fact, despite the figures that I shall presently point out, and which indicate on the surface a huge aggregate buying power, there exists to-day a serious condition in American agriculture. The farmer, despite his unique position as both a capitalist and laborer, is more than any laborer the victim of arbitrary and outside control in the prices he receives for his handiwork and products. No other producer in this respect is as helpless as the farmer. He must take what he can get for what he has to sell; there is no price fixing power in which he has a direct voice. Yet despite the disproportion between his return and his investment, he does not hesitate to put more capital into his profession. Being a serious-minded man, in love with his profession, intensely conscious of his responsibility to society as a producer of foodstuffs, deeply patriotic in every sense of the word, he frequently buys and invests much beyond legitimate limitations of his yearly income.

But whatever I have to say about the present market must be conditioned by those economic disturbances that affect us all, but which affect the farmer in the present crisis more acutely than any other class. Do not be misled by those false prophets who point to the marked increase in value of agricultural land as an indication, to quote a great New York newspaper "that planting and reaping have been profitable." Do not forget that much of the recent and rapid increase in land value in the Middle-West, and particularly Iowa, have been the result of rapacious land speculation. This speculation in itself has not only unduly inflated land values in this region beyond the limits of their productive returns, but it has increased, as I recently pointed out in an editorial in my farm papers, farm tenantry to an alarming degree. In Iowa, 55 per centum of the farmers are tenants, less than one-half of all the resident farmers are owners. In addition, there has been a decrease of 17,289 farms within the last five years. This condition not only shows a drift toward landlordism; it also indicates that the great business of agriculture is not in a satisfactory condition. Let me cite briefly this fact: hogs on the Kansas City market have declined $9.50 to $10.00 a hundred in the last four months. Under the present price of feed with which these hogs are fattened they can not be sold at less than $22 or $23 a hundred and return a profit for the farmer. Let me indicate in addition that Kansas stockmen, last summer, have lost ten million dollars on their investments, due to the arbitrary conditions under which the livestock of the Middle-West must be marketed. I have not said anything about the losses that have affected the great winter wheat crop of Kansas this year, losses from a variety of causes that amout to several millions of dollars.

I have cited these conditions somewhat at length in order that you might have no false illusions as to the possibilities of your market for motor trucks. Actually and potentially, the market may be summarized almost precisely in the terms that I have and shall still further indicate. But these other economic handicaps of the Middle-Western farmer, which only a small part of the greater outside public ever realizes, are at work. And unless some readjustment of

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values is effected whereby the farmer will get his full share of economic justice and an adequate return for his products, the future buying power of the farmer of the Middle-West will be seriously limited. This limitation, gentlemen, you may very soon feel.

But for the moment, let me revert to actual buying conditions. This year's crop figures and returns alone indicate there is waiting for expenditure in the 16 Mid-Western states, a buying power of more than 12 billion dollars, exclusively mobilized from the crop and livestock returns of the two and one-half million Mid-Western farms. Such a buying power as represented by these figures could wipe out our national war debt of 30 billion dollars in two and one-half years. What do these figures mean in terms that will interest you gentlemen?

Let us visualize this market still further. Of these 16 states, there are 4 whose products average one billion dollars; 8 with a valuation over three-fourths of a billion, and 4 with over a half billion each. Within this area is found the greatest relative percentage in the world of modern farm homes; the greatest percentage of farm-owned tractors, farm electric light plants, up-to-date machinery of all sorts and kinds, silos, and what is most interesting to you, a constantly increasing number of farm-owned motor cars and motor trucks. This huge capitalization and investment in buildings and equipment is found on a series of farms, the average value of which is $10,247, a valuation of $4,000 more than the average farm valuation in the remaining two-thirds of the United States. While not strictly a part of the agricultural wealth, the huge income that farmers in the South-West realize from oil leases and oil royalties is not to be ignored. In 1918 the three states of Oklahoma, Kansas and Texas received 143 millions of dollars from this source.

SUCH figures as these, coupled with the unusual average of literacy, a literacy maintained by a substantial consolidated rural school system, means that we have the greatest actual and potential buying market of any region, size for size, population for population, in the entire world.

Let me go still further and cite to you some of the concrete evidence of the substantial financial interest that this Mid-Western farmer has in automotive vehicles. In Iowa, with a population of 2,224,771 there were in 1919, 285,000 motor cars or one car to every 7.8 persons. These figures are well-matched by statistics for Kansas, one car for each 8.9 persons; by Nebraska, with one car for every 7.3 persons; by South Dakota, with one car for every 8.3 persons. In the entire 16 states, there were in June, 1919, a total number of 2,357,820 motor cars, or one car for every 12.9 persons. Contrast these figures with those for the other 32 states, where we have a total of 6,353,586 cars or only one car for every 19 persons. Remember that these latter figures include those populous cities in and around the Atlantic seaboard, whereas the figures which the Middle-West can include, contain only three large cities. In other words, over one-half the motor cars of the country are found in the 16 Middle-Western states, and the major portion, some 65 per centum, are farm-owned.

The United States Department of Agriculture estimates to-day that more than 70,000 motor trucks are farm-owned. Unfortunately, figures are not available for all Mid-Western states in reference to the actual farm distribution of motor trucks. But Kansas, my own state, may serve perhaps as typical for the rest. Here we have a farming population which owns 191,436 motor cars, but only 9,315 motor trucks.

The moral that can be drawn from these contrasting figures, I shall point out now. Of course, the answer frequently given to the relatively low distribution of motor trucks in this territory is that the American farmer is not yet completely converted to the idea of power farming. This might indeed have been very true four or five years ago. But to-day he has so fast absorbed this idea, and has so quickly put it into practice that we can no longer accuse him of being unconverted to the idea of greater productiveness through an extension of power farming. Your friends, the tractor manufacturers and distributers, can tell you how rapidly the tractor market is growing. To-day the cry is not "Educate the farmer to the idea of the tractor," but "For Heaven's sake, manufacture fast enough to supply the demand. Sell us tractors."

LET me cite another illustration. Since last spring, it has been almost impossible to supply the demand for automobiles in this same farm market. The medium-weight, medium-priced car, used or unused, has been at an absolute premium. This is not because the farmer is given over to the dubious delight of automobile joy riding; quite the contrary. With its quickness and flexibility as opposed to the horse-drawn vehicle, the automobile, both as a carrier and hauler, is an absolute necessity to the farmer's business. In fact, a recent investigation showed over 75 per centum of the Middle-Western farmers bought their cars not for pleasure, but for business.

These facts point to their own moral. It is my humble opinion that too many manufacturers have been intrigued by the somewhat immediate and waiting market of the cities, which after all is only legitimate and to be expected. But such a motor truck sales policy followed too long and too exclusively, leaves ignored and neglected the vastly stronger and much larger in all its ultimate potential values, the farm market of the Middle-West.

I am not prepared to advocate at this point, that policy which would place on every farm a motor truck, just as I am not prepared at the present time to urge every farmer, irrespective of his resources and acreage, to buy a tractor. The mere physical situation, the man and money capital, as well as climate and soil factors, must be taken into consideration. Besides, I do not think that there is yet a motor truck or tractor on the market sufficiently low-priced, sufficiently enduring and sufficiently backed by an adequate service system, to make every farmer buy one. In fact, it is my conviction that no farmer, excluding the truck grower and specialty crop grower, should, as a general thing, under present motor truck prices and specifications, purchase a motor truck unless he be the owner or operator of a farm of 360 acres or more. You know as well as I that in reckoning the ultimate return on such an investment, that it is not enough to count merely the first cost and ignore the constantly mounting factors of overhead and depreciation. But there are some 250 thousand farms of over 350 acres in the Middle-West. I doubt if 15 per centum of them, to-day, own motor trucks.

There is still another phase to the situation in these 16 Middle-Western states. There are 10,042 inland communities of under 2,500 inhabitants that are absolutely dependent for their incoming and outgoing freight service upon some form of vehicle transportation. In a majority of cases, either owing to an unexploited market or the state of Middle-Western roads, it is the horse or mule, and not the motor truck, that does most of the hauling.

The mention of good roads brings me to a subject very near to my heart. Of the total of 2,250,000 miles of rural highway in the Mississippi Valley, only a scant one hundred thousand are hard surfaced, or 7.8 per centum of the total. I have not time here to discuss the economic and social advantages of good roads. But I do believe that the future development of the automotive industry and particularly the extension of the motor truck market is absolutely dependent on the extension of hard surfaced highways.

IN some recent investigation conducted by the Bureau of Research, the *Capper Farm Press*, of farmers hauling stock by motor trucks, there was found a distinct relationship between the amount and value of livestock hauled and the radiation, small or great, of good roads centering in and about such stock yard centers as St. Joseph, Omaha, Kansas City, and Oklahoma City. If I could, I should like to show you two charts which would indicate much more vividly than is possible in words how much a stock yard center as Omaha, with its relatively greater mileage of hard surfaced roads, draws more hogs greater distances than do the stock yards in Oklahoma City. If I had time, I should also like to tell you how one good road begets another, and how a good road, plus a good motor truck, begets almost six motor trucks in any community and in any locality. But I have not the time to do this.

In short, the points I wish to make are these:

The farmer to-day, and particularly the Mid-Western farmer, represents the most solid as well as the most intelligent section of American public opinion. Furthermore, provided he gets his full measure of economic justice, he represents greater buying power in terms of dollars and cents, than does any other class in the country. In particular, the Middle-Western farmer is the richest in resources and the quickest to buy any necessity or luxury that the market af-

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fords. Especially in these days of acute farm labor shortage is he quick to invest in any machine or device that enables him to keep up the high level of his productivity and to make cheap and efficient the extensive farming which he practices.

I am not in a very accurate position to criticize some of the sales methods now in force, but I should like to indicate what seems to me, speaking in quite general terms, both from the attitude of the farmer and business that it is frequently a short-sighted policy. Some time ago, in glancing casually over the distribution schedule of a leading light motor truck manufacturer, I was somewhat surprised to note that district quotas had been determined arbitrarily. That is to say, having produced a certain number of motor trucks, the number to be distributed to the various sales districts had been prorated with no very accurate knowledge of local crop conditions. Of course, such a scheme, backed by advertising and a hustling sales force, would probably dispose without difficulty of any normal output. But it seems to me that a more accurate distribution could be made, and a larger production insured if the conditions and state of the various local farm markets were carefully studied as to their actual absorptive capacity.

LET me cite a case in point from the tractor situation of this year. Certain tractor manufacturers, pursuing the policy of an arbitrary fixage of distribution, found themselves early in the summer with a relatively large number of machines still unsold. This condition obtained in the Northern States in the corn and wheat area. Further to the south, however, particularly in Oklahoma, there was at the same time, if not an actual dearth of tractors, at least great difficulty in supplying the demands of the farmers. A superficial analysis seemed to indicate that in the North, due perhaps to certain political influences activity at work, and a feeling of impending economic instability, that the farmers were holding off from buying, hoping for a sharp break and decline in the tractor market, with subsequently lower prices for these implements. These conditions may have actually obtained, but a more thorough analysis indicated that the reason why there had not been a normal absorption of tractors was due principally to climate and soil conditions.

In brief, owing to an exceedingly wet spring, longdrawn out, seasonal plowing was not possible with power machines, hence, the lessened demand for tractors. On the other hand, in the Southwest, plowing and cultivating conditions had never been more favorable. In addition, the previous season had produced bumper crops. Still further, an active tractor propaganda carried on by the various farm papers and the agricultural colleges, plus tractor demonstration and a timely campaign of farm paper advertising, had created a very active market. Some tractor distributers were unable to meet the situation.

The moral to be applied by motor truck manufacturers is not far to seek; production and distribution schedules should not be based upon an arbitrary fixage which ignores these local fluctuations, up and down, which operatés among farmers and which determines their qualitative buying capacity. In other words, follow the regional trend and tendencies throughout the Middle-Western states, and remember that what is true for Minnesota, may not be true for Oklahoma, and that production and hence distribution should be governed by the natural law of demand. Of course, I do not ignore the fact that motor truck interest may be deliberately propagated. In fact, I am strongly of the opinion that the education of the farmer in the possibilities of the motor truck as a link in the chain of power farming has only begun to be realized. It must be carried on. I do not know a single farm paper of consequence in the country that is not devoting its editorial and news resources to further this end. But at the same time, if the potential farm truck market is to be developed to its highest, and if the manufacturer is to be protected against under-production or over-production, a very careful check must be kept of local climatic and economic conditions.

In my opinion, the potential market of the Middle-West has not yet been captured by the motor truck manufacturers. Despite economic buying limitations, which in themselves will disappear each year more and more as a higher level of prosperity is reached through the extension of power farming, there exists to-day a market almost untouched and under-developed. And in this brief analysis I have made no mention of the rural express routes, both private and community-owned, that are everywhere springing up throughout the Mississippi Valley. One just formed in Kansas, plans to install, all up and down the state, over one thousand motor trucks next year. Its routes will criss-cross the state from end to end, and will serve not only to link up town to town, but will also serve to link up farmer to farmer, and the country to the town.

Oil Burner Clears Snow-Clogged Street at Rate of 5 Miles an Hour

Snow-and-ice-clogged streets in the large northern and eastern cities during the past winter months brought out many new types of snow removal apparatus. One of the most novel and successful of these innovations was the oil burning snow melter shown herewith mounted on a Mack 7½-ton motor truck in use in Brooklyn, New York. It is the invention of L. V. Stevens, a Canadian engineer, and was first used successfully by the Canadian Pacific Railroad to clear its tracks.

The motor truck which carries an 1800-gallon tank of crude oil travels at the rate of 5 miles per hour, belching an incandescent flame some ten feet ahead, collapsing snow banks as if by sun stroke. The oil and air are both forced ahead under compression through a mixer or carbureter, in a manner similar to the practices established in the case of blast furnaces and oil burning locomotives.

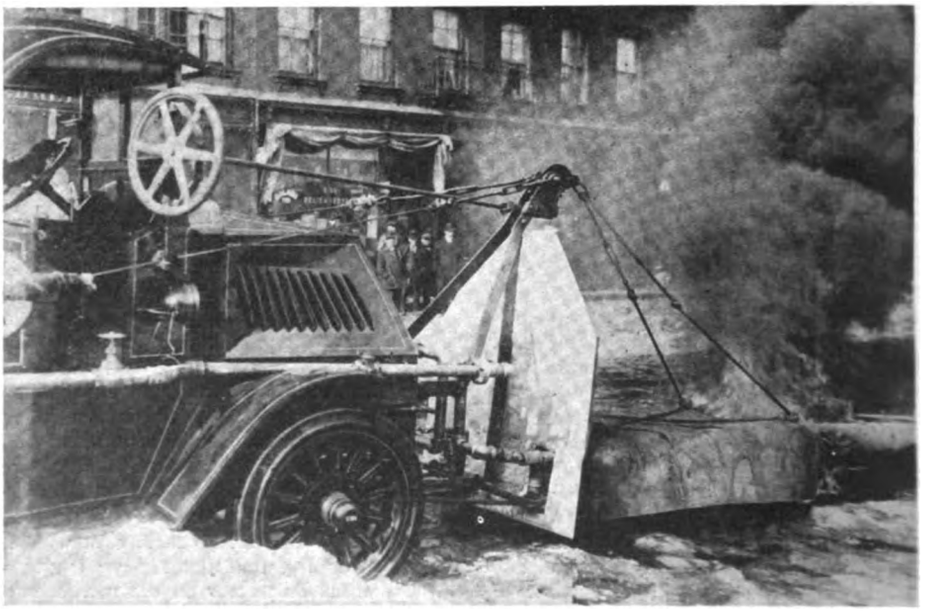
Horses All Gone; No Use for Pills Doctor Changes to Rubber Tire Ills

"Treating the ills of horses once was a good profession and paid well, but not any more. I am going to treat the ills of tires."

This is the way Dr. Fred Pritchard, lately a veterinary surgeon in Tekonsha, Michigan, explains why he is turning his horse hospital into a tire hospital. Dr. Pritchard recently completed a course in tire repairing and soon will open a tire repair shop in his home town. He says he expects to retain most of his old patrons since nearly all of them now drive automobiles instead of horses.

Steinberg With Rainier

S. W. Steinberg has become publicity director for the Rainier Motor Corporation, New York, succeeding Putnam Drew. Mr. Steinberg has been engaged in advertising and publicity work for the last five years.



Oil-burning street clearing machine.

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Motorizing Terminals

By B. F. FITCH
President Motor Terminal's Company

FOR years motor trucks have been proved valuable transportation mediums, but their adoption and scientific operation has been ignored by railroads whose business was primarily transportation. This was possibly due to the fear of competing service similar to the old theory a couple of decades ago that interurban lines would detract from railroad earnings.

The ingredients to be considered in transportation cost estimates are tons, miles and minutes, and, generally speaking, the greater number of tons and miles, crowded into the smallest number of minutes, the lower the transportation cost.

Every unit of transportation from wheelbarrows to gondolas is valuable when allotted exclusively to the service it is best fitted to discharge. A team can successfully haul 75 ton-miles and a motor truck 500 ton-miles in a 10-hour working day. Compare this with railroad performance in which the average box car movement is but 25 miles per day. If loaded with merchandise to but a 10-ton average, it discharges but 225 ton-miles in a 24-hour day. It is therefore, obvious that box cars suffer a handicap.

Freight house operating practice demands that box cars lie idle 10 hours a day. If utilized exclusively for transportation and kept continuously moving the remainder 14 hours, even at an average speed of but 20 miles per hour with 10-ton loads, the potential possibility of each freight car is 2,800 ton-miles daily.

There is practically no limit to what the rails will carry, if cars, when consolidated in trains, are at once started and kept continuously moving; therefore, it is logical to charge inadequate terminal facilities with the major portion of the box car's tonnage deficiencies. Inadequate terminals alone are not responsible for this nor can either the railroads or the public be censured for illegitimately using box cars in lieu of other facilities for short term storage. These are influences detrimental to box car efficiency, but without terminals, necessary evils.

The prime trouble is that, as an operating necessity, in absence of other facilities, box cars have been assigned to a service for which they were never originally intended, and this make-shift usage has complicated switching interchanges at all terminal points to detriment of high mileage efficiency of all cars.

Our national transportation practice and trade influences of the traffic do not permit of any radical terminal changes. Any revolutionary attempts along this line might embarrass our production resources as greatly as a change in the monetary basis. Therefore, evolutionary improvements only can be considered.

Refinements of present rail practice and additional facilities will occur, but rail transportation can not be greatly improved because locomotives are now practically up to the safety limits of rails and bridges and without increasing weight of locomotives, draw bar efficiency can not be increased, and without an increase in draw bar efficiency transportation costs can not be lowered. Thus, obviously the field for improvement is terminals.

TO demonstrate the fact that railroad transportation has outgrown railroad terminals, it is interesting to note that from outer classification yards to pier station delivery at New York the cost to carrier is not less than $3.50 per ton and, similarly, at Philadelphia not less than $2.50 per ton, or a joint terminal cost of $6.00 per ton. Whereas, the main line haul between these two terminals, if estimated at a maximum cost of 6 mills per ton-mile, suggests a transportation cost of 60 cents versus terminal costs of $6.00. Chicago is no better off than Philadelphia and the haul is about ten times as long; hence, joint terminal cost is as great as the transportation or rail haul cost from Chicago to New York.

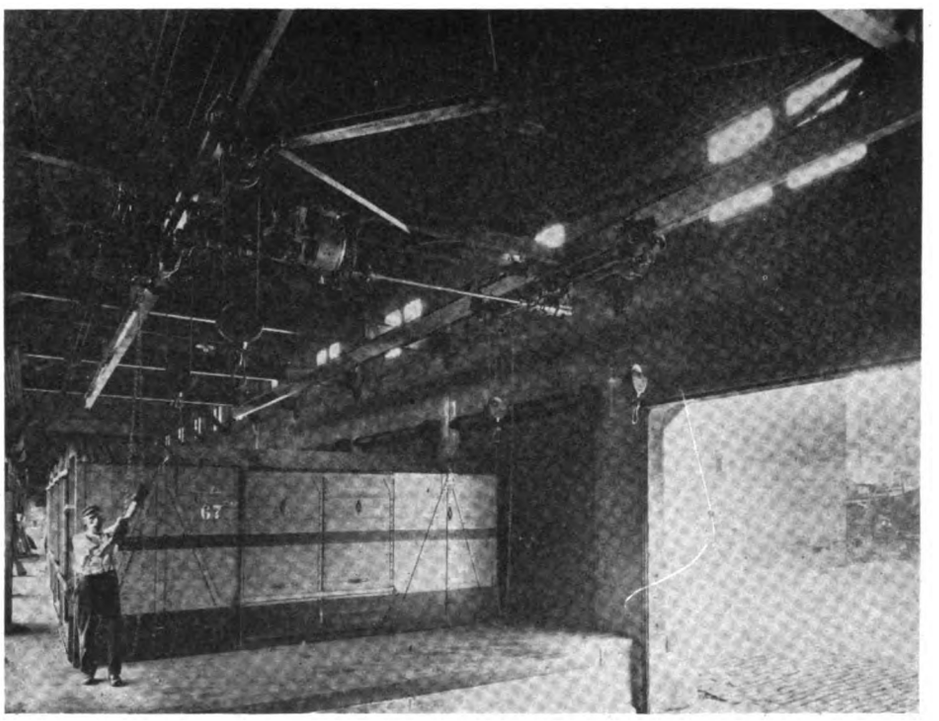
After five years of terminal studies, inspecting innumerable stations built over fifty years ago, which are still the intakes and outlets of our great transportation systems, using the recognized best equipment in the world, no wonder the subject of terminals is a topic of nation-wide discussion and, naturally, all with creative brains are offering solutions.

With unlimited financial resources the engineering talent of this country can quickly solve the problem. Ideal joint terminals at a cost of $50,000,000 to $500,000,000 are possible in all of our principal centers, but present chaotic conditions considered, who will assume the responsibility of such abnormal financing? Even if offered opportunity to avail themselves of such the railroads would have to scrap present huge investments and the scrapping of these investments at any industrial center will disrupt realty values to possibly financial ruin of innumerable manufacturing plants built in suburban localities on the theory that the inducement which warranted the building would afford perpetual service.

For this reason each present terminal layout must be continued substantially as at present. Conservatism recommends no radical changes, but demands evolutionary changes to better conditions for both carriers and shippers.

Every city in the country has its labyrinth of rails, team tracks, private sidings, obsolete main freight stations and substations, between all of which box cars are shuffled or switched around, like cards in a solitaire deck, in the performance of a duty for which the cars were never designed.

The innumerable switch cut movements of such cars confiscate capacity of the rails



Freight terminal, Cincinnati, showing bodies in control of single operator.

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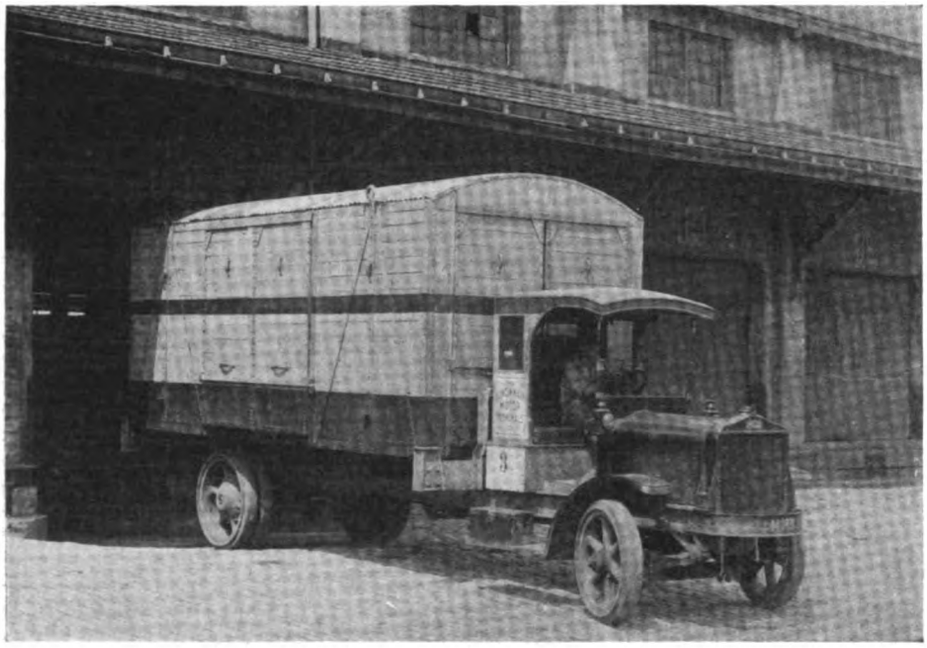


Truck released; body over pit awaiting trolleying to platform.

and the cost of handling these cars over rails, to detriment of through traffic, is primarily responsible for excessive terminal expense.

If all the large cities in the country could be idealistically furnished, scientifically designed and mechanically operated freight houses, there is no question of accruing economies both in terminal practice and transportation costs, because the railroads then would enjoy a one-point make-up and a one-point break of all freight cars. The result would be loading of cars to weight or displacement capacity for uninterrupted direct movement to other terminals. This consolidated loading would naturally decrease the number of cars now dispatched from a plurality of stations within any one city to the existing plurality of stations in all other cities.

DESPITE this opportunity, even if attainable, the industrial trap car and the intra terminal trap car will apparently always complicate terminal interchanges to detriment of switching refinements. Terminal operating economies will be in direct ratio with the decrease in the number of interchange switching combinations. So apparently new freight stations at huge investment are no guarantee of great reductions in terminal expense, because freight station labor cost is but a small item as compared with total terminal expense.

Between all the widely distributed freight houses of the various railroads in each and every terminal box cars are used in transfer or connecting line service. When so used, they are in various sections termed "trap," "transfer" or "ferry" cars. For instance, in any city with seven non-competing railroads radiating to different sections, each line receives daily in its city cars some freight for each of the six connections. Numerically this means 42 cars in transit to and 42 cars in transit from, a total of 84 cars. But due to yard interchange delays these cars average a third day arrival instead of a second day arrival; hence, 252 cars are assigned daily to such service. Thus 75,600 car days are required annually.

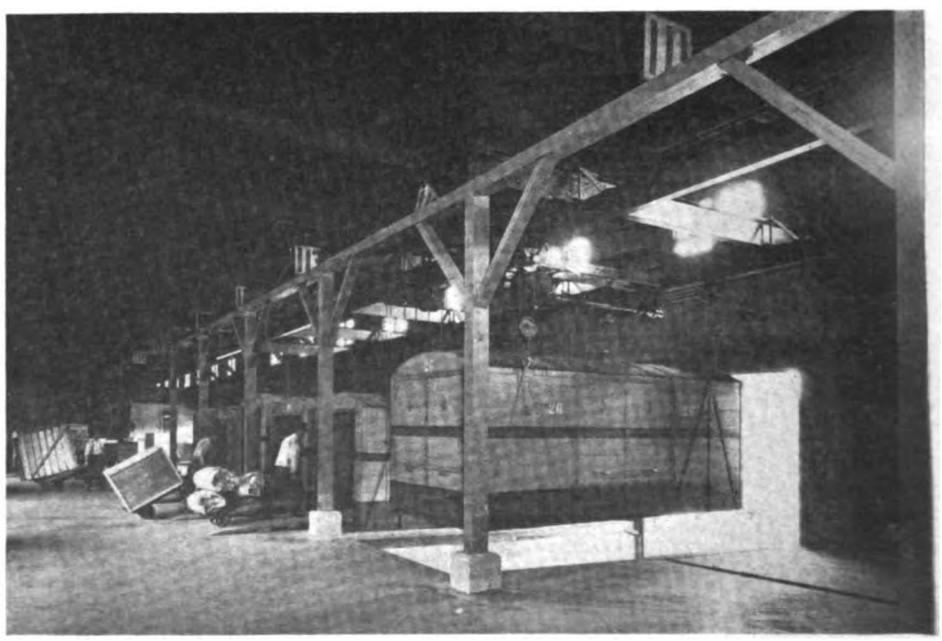
Industrial expansion at any city with seven initial lines, has, as a rule, outgrown station facilities and railroads for economy's sake have strategically established sub-stations along their rights-of-way as traffic influences for shipments from outlying districts. Since all the freight from these outlying districts has to be brought to main stations to be consolidated in cars for dispatch from such main stations to destination points, and since all of the freight for these sub-stations comes out of main station cars on arrival, trap cars are necessary in this main sub-station service of each line. The number of cars so used is a multiple of stations. If, as above stated, each of the seven lines has three stations, 42 cars are required, movement delays to which are as great as connecting line cars; therefore, the wasting of an additional 37,800 car days. This explains one of the reasons for car shortage and an operating abuse which has been obsoleted by the success of a motor terminals installation at Cincinnati, Ohio.

Briefly, this installation consists of overhead rails, electric cranes, electric hoists, motor trucks and a plurality of interchangeable motor truck bodies. The system of operation requires an empty body for each station movement demand of railroad on its inbound main station platform. At the larger stations there are several locations for such body settings, thereby decreasing the trucking distance for freight. As the freight comes from the cars, it is trucked to the nearest location containing a body carded for any connection or any sub-station.

When loaded, these bodies are sealed and under telephone order of a joint dispatcher, employed by the railroads, mechanically loaded onto motor trucks and thus routed over the city's streets to the connection.

On arrival at the outbound platform of the connecting line, the body is mechanically removed and an empty body, previously unloaded, is similarly put onto the motor truck chassis for delivery to the inbound platform of that house, where the operation is repeated and another loaded body forwarded in the same manner to some other freight house.

IF the load happens to be to a sub-station, it remains on the platform until the dispatcher is advised by the agent at the sub-station that a return load is available. Then the loaded body of the inbound freight to that substation is forwarded and the motor truck exchanges same for the previously reported load of outbound freight to be delivered at the main station,



Truck backing into pit with empty body for loading.

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where it is consolidated with other city freight in line cars made up daily to innumerable other destination points.

From the above it is evident that all freight, except possibly the portion arriving during the last hour of station operating day, whether between main and substations or between main stations of the various railroads, is currently loaded and out of the terminal. Previously this freight by trap cars suffered an average three day's delay and the shuttle movement of these individual cars over terminal rails interferred with the group movement of complete cuts of station cars. Hence, the congestion which previously made Cincinnati notorious as a check-valve in rail routings.

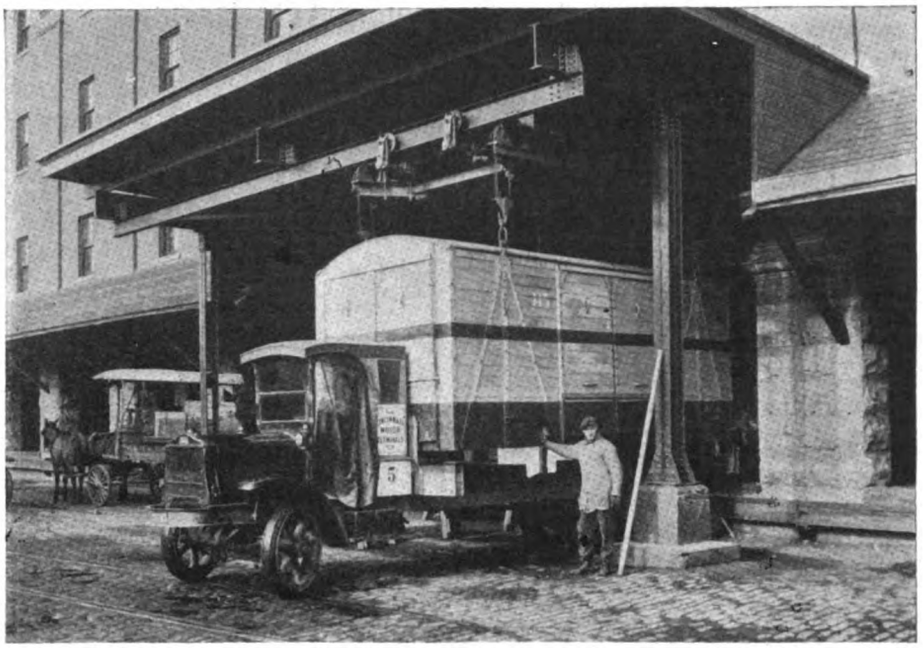
In May, 1917, the Big Four Railroad permitted a test installation between its five main and sub-stations. The innovation was an early success, but the other roads were skeptical of its enduring efficiency. In the early months of 1918 a special committee was appointed to analyze the entire terminal and, based upon Big Four accomplishments, recommend what economies and benefits could be anticipated from completely motorizing Cincinnati's terminal.

The summary of this comparative report prophesied the following, and as a result contracts were negotiated

Annual economy, $61,652.96.
Advance movement of freight, 52.4 hours.
Increase inbound platform floor area, 14.8 per centum.
Increase outbound platform floor area, in ratio with station operation.
Increase main station trackage, 21.4 per centum.
Increase main station realty, 122,660 square feet.
Release 66,862.5 cars for line service per annum.
Extension of present labor, 30.4 per centum.
Eliminating the rehandling of 86,976 tons of freight, lessens railroads' liability of loss and damage.

IN 1919 equipment orders were entered and the railroads commenced station changes and superstructure construction. The terminal is not fully equipped, for both the railroads and the Cincinnati Motor Terminals Company which is operating this equipment on contract basis for the railroads, have suffered exasperating delays. However, in recent analysis of accomplishments it is proved that, due to increased operating costs of railroads the prophesied 17.1 cents per ton economy is in practice actually a saving of 35.2 cents per ton and, therefore, the annual economies will be $126,507.75 instead of $61,652.46.

This service has proved that all widely distributed station facilities can be laced up as a unit without investment cost to the railroads, thereby giving to each and every terminal the benefits of a union freight station. The rates paid for the service are less than what interest charges alone would be on the cost of constructing a consolidated terminal. The operating program of railroads and the established perquisites of shippers are in no-wise disturbed, but the railroads at large through the influence of this current versus their past interrupted movements enjoy an increase of terminal rail, station rail, and station platform facilities. This increase can be perpetually extended at minimum investment, in ratio with increasing tonnage



Outdoor arrangement for loading and unloading trucks.

demands, which naturally will accrue at any industrial city enjoying better shipping facilities.

Extensions are now possible in the form of rail sub-stations or off-track warehouse sub-stations by this system, and can be gradually provided when tonnage demands warrant. There is no necessity to finance elaborate facilities to take care of accruing demands which may not develop for fifty years.

What has been done at Cincinnati can be adapted to the varying demands of all principal terminal cities. In some the connecting line trap car predominates as the greatest detriment to successful terminal operation. In others the sub-station trap car.

The flexible possibilities of motor trucks are now clearly defined for industries whose transportation facilities are dependent upon rail extensions. Opportunities at each point are limited only to intelligent installations following detail analysis to establish the greatest terminal deficiencies of carrier to meet shipping demands of the public.

Accomplishments at Cincinnati warrant idealistic theories of the system as applied to the greatest terminal problem in the world. New York is that problem, for as the established principal port of this country, our industrial expansion is restricted by New York's lack of port facilities, unless, as will ultimately happen, the nation at large refuses to longer suffer by reason of New York's conservatism and creates other trans-shipment ports.

AT present the railroads monopolize approximately 30 per centum of Manhattan's piers for freight stations. To expand the port these piers are indispensable for coastwise and overseas steamers. Where not individually owned, the rental value of piers is out of all proportion with freight tariff returns.

A few blocks inland, realty enjoys but a fraction of bulkhead rental values. If inland joint stations in say 12 zones were constructed on this otherwise comparatively non-productive realty, the railroad piers could be released for shipping and station facilities be attained by the railroads at practically no cost, because of increased rentals possible from warehouses and industrial floors above joint freight terminals.

If all roads contributing this terminal had transfer stations at their rail bulkheads or a few blocks back from the Jersey, Staten Island and Bronx valuable waterfront, carload and less carload package freight could be immediately transferred from cars to motor truck bodies, which would be designated for each of these inland stations, and the freight cars thereby released for immediate reloading of outbound freight. The number of bodies assigned each zone station would be sufficient to meet the tonnage demands.

THESE bodies when loaded on motor trucks, would be routed over streets to the nearest available Staten Island or Jersey slip for ferrying to the Manhattan slip nearest inland station destination and vice versa on return movement. Until they were proved inadequate, public ferries could be used. Later, if necessary, possibly special ferried and special slips at a few of the innumerable pier points now occupied by railroads could be provided.

If we add to the generally admitted $3.50 terminal cost to carriers the established minimum cartage cost of $2.50 per ton to shippers, the joint terminal cost at New York is $6.00. Under normal conditions approximately 30,000 tons daily moves from Staten Island and Jersey to Manhattan and 20,000 tons daily from Manhattan to Staten Island and Jersey on outbound movement, a total of 50,000 tons daily, which at the above citied $6.00 joint cost is an item of $300,000 per day.

For the railroads alone at Cincinnati the interchange is furnished by the Cincinnati Motor Terminals Company between stations within a 10-mile zone at rates averaging less than $1.00 per ton. The minimum

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is 80 cents and the maximum $1.25. If motor trucks moved by short ferry routes (at no operating cost in ferry transit other than ferry tariffs) no hauls from rail bulkhead transfer platforms to inland stations could exceed ten miles.

It is impossible to prophesy what rates for this interchange can be established, but they would certainly not be over $2.00 per ton. Due to the short haul afforded shippers by these inland stations and the unlimited tail gate space, which they would enjoy at such, the cost to shippers could not average over $1.00 per ton. Hence, it is logical to infer a joint net saving of $3.00 per ton is possible for 50,000 tons daily, an annual item of $45,000,000. The possible economy, now wasted in present practice, is reflected in the retail value of every commodity. No wonder the high cost of living on Manhattan! But one year's savings will more than cover the entire necessary outlay if the cost of inland stations is not considered.

The inland station investment is a realty venture requiring no financing on the part of the railroads, because assured rental returns from upper stories will invite outside capital to furnish the station facilities in ever increasing numbers as fast as the railroads desire to contract for the use of such.

In short, the motor truck, offers an opportunity to convert present transportation losses into profits for both carriers and shippers, and this opportunity does not suffer the handicap of engineering problems and long construction delays.

It is an immediately available asset, adoption of which is not entirely dependent on concerted action by the railroads. The initial installation at Cincinnati has demonstrated the possibility of capitalizing existing economic terminal losses to mutual benefit of all interests.

Dorris' Twins, Both Doing Fine, Endear Old Tune of "Sweet-Sixteen"

Twin orders for two fleets of 8 motor trucks each, from two different firms, were received by the Dorris Motor Car Company, St. Louis,, one day in March. The orders came from the General Warehousing Company and the Whistle Company, St. Louis, calling for delivery of sixteen Model K-4, 2½-ton, 162-inch wheel base Dorris motor trucks.

It was regarded as unusual that the two orders reached the plant on the same day and almost at the same hour. "We, naturally, feel that it was an unusual event in the course of a day's work," said Webster Colburn, vice-president and general manager.

Stan-Par Gets $6,000,000

Additional capital requirements of The Standard Parts Company are provided in a loan of $6,000,000, the arrangement for which has just been announced in Cleveland. Five of the foremost Cleveland banks and the Chase National of New York, together with Otis & Company and Borton and Borton, investment security houses of Cleveland, are behind the big parts concern in this financing.

Illinois Auto Dealers Form State Association

SPRINGFIELD IS CHOSEN AS HEADQUARTERS

One hundred and fifty Illinois automotive dealers met in Springfield, Illinois, March 22, in the Senate Room of the State Capitol, and formed the Illinois Automotive Dealers' Association. H. B. Pinkerton of Peoria, Illinois, was elected president. A charter and by-laws were drawn up; and a president, four vice-presidents, secretary-manager and treasurer and twelve directors were name. The new association is affiliated with the National Automotive Dealers' Association. During the morning meeting short and interesting talks were made by Mr. Sparks of Champaign and Mr. Reinhold, president of Chicago Vim Company. The afternoon meeting was opened by an address by H. B. Harper, president of the N. A. D. A. Mr. Harper spoke on the "Necessity of Organization." This talk was followed by a most inspiring address by Harry G. Moock, general manager of the N. A. D. A. Mr. Moock's subject was "Dealers, Get Together." A banquet was held in the evening. Gov. Lowden was present and spoke. The evening ended with Harry W. Atwood's well-known address, "Our Constitution, the Antidote for Bolshevism."

Tuesday morning, March 23, the following forums were held:

Truck Dealers—Mr. Nichol, Chicago.

Car Dealers—Mr. Pinkerton, Peoria, Ill.

Accessory Dealers—Mr. Bass, Peoria, Ill.

Tire Dealers—Mr. Sparks, Champaign, Ill.

In these forums subjects vital to these respective sections of the industry were taken up and discussed. John Nichol, president of the John Nichol Company of Chicago, Federal motor truck dealer, delivered a short address in which will be found the gist and substance of the motor truck dealers' meeting. Mr. Nichol's address will be found elsewhere in this issue of *Power Wagon*.

Edward S. Jordan, president of the Jordan Motor Company, gave a virile talk on "Automobile Merchandising." A. R. Kroh in his address on the "Motorization of the Farm" brought home to the members in a most emphatic manner the subject which is probably the most important economic question of the hour. Of this and the other addresses we shall treat further in a subsequent issue. Other addresses were made by L. A. Peil, president of the Chicago Automobile Trade Association, who spoke on "Our State, Our Business, Our Association"; George Fritz, National Field Secretary of Automotive Equipment Association, who talked about "Automotive Aggrandizing." Chas. Hendy, Jr., Manager of Ford Motor Company, Chicago, gave his famous talk "White Paint." Pyke Johnson, Washington, D. C., representative N. A. D. A., one of the foremost national authorities on his subject, gave a talk "Road Building from a National Viewpoint." In his talk Mr. Johnson also spoke on the road situation as it exists in Illinois.

Fred C. Zillman was appointed secretary-manager of the new association. Mr. Zillman will have an office at Springfield, which was designated as a permanent state headquarters for the Illinois Automotive Dealers' Association.

Nash Motors Company Plant Now Has Over Million Feet Floor Space

An important addition to the factory of the Nash Motors Company is found in a building 120 by 120 which was added to the large foundry. There also has been constructed a foundry warehouse and pattern storage 80 by 100 feet. Other new buildings include a new roller bearing tool room and pattern shop, 100 by 600 feet and an addition to the sheet metal shop measuring 32 by 236 feet.

Four courtways that formerly separated long lines of saw-tooth buildings have now been roofed and turned into component parts of the factory. One of these measures 180 by 16 feet and the others, 90 by 257, 60 by 257 and 42 by 236. Under construction now are a new boiler room 50 by 50 feet and an addition to the heat-treating department measuring 40 by 140 feet. The construction of all these buildings is thoroughly modern and was carried out without interruption to work in the shops.

There are in operation in the Nash factory over 1,500 productive machines and over 300 factory maintenance machines; the plant embraces 1,011,332 square feet of floor space and in the power plant which keeps the machinery in operation, 120 tons of coal are used every 24 hours. Five thousand men are on the payroll of the Nash Motors Company.

London 'Bus Figures

The report of the directors of the London General Omnibus Company, Ltd., for the year ended December 31 last, shows expenditure, $27,402,920; interest, rentals, and other fixed charges, $542,060; appropriation to reserve, $1,425,000, making a total of £5,873,996. The traffic receipts amounted to $26,201,455, and miscellaneous receipts to $1,038,470, making a total of $27,249,965, leaving a deficiency of $2,120,015, which is met by a contribution from the Common Fund of the Underground group. In addition, the company receives a proportion of the balance of the Common Fund amounting to $794,220, and, having brought $304,650 into the accounts from the previous year, there is available for dividend and further reserves the sum of $1,098,870. The final dividend now recommended of 3 per centum makes, with the interim dividend, a dividend of 7 per centum free of income tax for the year (which is 1 per centum less than in the previous year), whilst there then remains to be carried forward the sum of $298,630 as against $304,650 in the previous year.

Since the close of the war 120 new motor truck plants have been established in Kansas City, Mo.

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Tractors Replace Oldest Trolley

By M. J. ADAMS
Assistant Advertising Director Armour & Company

THE oldest electrified elevated railroad in the world is going out of business. One of the picturesque sights of the Chicago Stock Yards, it has been on the job for the last 28 years, hauling meat and other packing house products between the various departments of Armour and Company's great Chicago plant. This system has done its work well but a better method has been found and in the interest of greater efficiency the elevated trolley system, operating on narrow gauged tracks, will soon give way to a fleet of electric tractors hauling trailers which are not hampered by tracks but have the ability to travel anywhere.

Away back in 1892—"Denny" O'Neil, chief electrician of Armour and Company, well remembers the day—the elevated trolley system was installed to haul the products of the plant to the loading platform and the various other departments. This was the same year that the first passenger trolley car appeared on the streets of Chicago. The latter was a surface line for passengers while the Armour system was an elevated line for freight. The following year, an elevated railway line for passengers made its appearance in Chicago, the cars being drawn by small steam locomotives.

An elevated transportation system was virtually forced upon Armour and Company, by the congestion in freight, which was a regular thing even in such early days of the industry as 1892, before the packing business had reached anything like its present proportion. To relieve this congestion in the streets about the Armour packing plant, an elevated street was built, and the overhead trolley car system of transportation was installed at a cost of $75,000. This elevated road connected all manufacturing departments to each other and to the main shipping points. The equipment consisted of 7 trolley cars, containing 15 H.P.-500 volt motors, 950 trailers of various designs, 3 miles of overhead trolley and rails.

For years, the overhead trolley system proved adequate for the needs of the great packing plant, but gradually the business of the company expanded, which meant more territory for the trolleys to cover, and considerably greater tonnage each year to handle. By 1917 the Chicago plant of Armour and Company covered 39 acres, and the result was a great number of long hauls between the point where the products were manufactured and the common assembly or shipping point. Figures for that year showed that the amount of goods handled by both its elevated road and hand trucking totaled approximately 405,000 tons.

By 1917 the requirements of the Armour plant had outgrown the facilities of the inter-departmental traffic system. Furthermore, the plant experts found, on investigation, that there was a great deal of unnecessary hand trucking done about the plant, which they felt should and could be eliminated. Because of these developments, the first tractors were installed at the plant, and worked on test along with the elevated trolley system. It was soon discovered that they had certain advantages which the trolley system did not possess. They could go anywhere—they were not restricted to tracks. They could carry goods from the source to their destination. Thus the number of handlings was cut down greatly And so the fleet of tractors grew in size. To-day there are sixty. Before testing the tractor and trailer system against the trolley car system of transportation, tests were made and cost kept on the tractor system vs. the hand trucking system. From the assembly room to the cars the tractors showed a reduction in hauling costs of 25 per centum a ton, which to-day, by reason of other short cuts, has been increased to a saving of 35.244 per centum a ton.

Next came the test between the electric tractor system and the trolley car method. One branch of the elevated railroad was shut down. A four week comparison was then made. During the first two weeks the four-wheel trailers and tractors were used and during the second two weeks elevated trolley car method was employed. At the end of the test the figures showed that a 16 per centum reduction in costs per ton had been effected through the use of the tractor and trailer system. It was upon the recommendation of M. D. Harding, superintendent of the Chicago plant of Armour and Company, and Geo. B Mulloy, of the Motive Power Department, that the first tractors and trailers were installed at the Chicago plant in the interest of greater efficiency and lower hauling cost for packing house products. The value of the new method was quickly recognized and the number of tractors in service constantly increased.

"We attribute the saving to the fact that the tractors could go directly into the department and haul the trailers, thus eliminating hand labor required for pushing as well as rehandling from the department floor," says an Armour and Company re-

Armour & Co. replace trolleys with tractors.

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port on this subject. "We also noted less overtime hours required to accomplish the loading, better and quicker service, and less exposure of the product to atmospheric temperatures, which especially in the summer time was of great importance.

"At present we have sixty tractors in service, all of which are a paying investment. We figure each machine pays for itself in one year's time. In some cases we have saved the labor of three men and in others as many as seven by installing a tractor. These installations have been made slowly; that is, one or two at a time, and in every case they make good. In every case the various department foremen have been agreeable to and heartily in accord with the installation of the tractors, as they soon saw the advantages such as relief from shortage of labor, congestion, quicker service, etc.

"Our tractors, could, if pushed to the maximum, handle each 50 tons of freight per day of 10 hours. These hauls vary from 90 to 1100 feet but the average is about 400 feet. In most cases the hauls are made over level surfaces. What grades we have to contend with are short, varying from between 10 and 25 feet, the slope of which is from 2 to 10 per centum."

Most of the tractors in use at the Armour plant are of the Mercury make. A recapitulation shows the cost of operation per week to be $58.90 for a tractor and train of 10 trailers, divided into $5.30 for overhead, $4.00 repairs, $3.00 for power, and $36.60 for labor. The outfit handles 60 tons of freight per day, or 360 tons in a week and the cost per ton on the above basis is 16.4 cents.

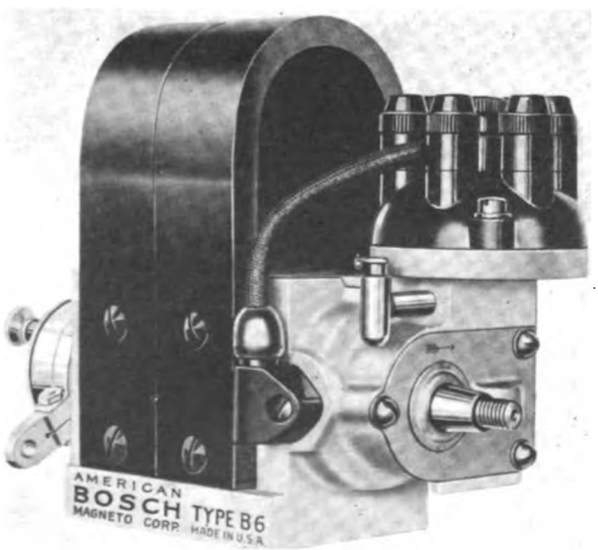
Reports indicate that motor vehicles shipments for the month of February will amount to more than 24,000 carloads compared with 19,152 carloads in February, 1919. Notwithstanding adverse shipping conditions these figures exceed any previous record for the month of February. In addition more than 22,000 machines were driven overland.

15,000 Machines Stored in Michigan—Toledo Tone

8,000 FREIGHT CARS NEEDED AT ONCE

There are now over 15,000 automobiles and motor trucks in the Michigan-Toledo zone stored by the factories awaiting shipment. This represents approximately $21,000,000 borrowed to finance this business pending shipment and delivery to buyers at a cost in interest of say $100,000 per month. But this is probably doubled from the fact that dealers have taken thousands of machines from the factories short distances over the roads and stored them awaiting car supply. Driving cars over the roads in this manner has provided an outlet for production. As soon as warm weather sets in driving overland will be immediately stopped on account of road conditions Without automobile cars and without drive-aways, production would have to be curtailed or stopped, affecting thousands of skilled mechanics, the financing of the industry amounting to $6,000,000 per day in finished product, affecting its allied industries in a similar way and stopping the business of automobile and motor truck dealers throughout the country.

In view of these conditions and with the heaviest season of production at hand and machines already stored in quantities equalling about 8,000 car-loads, it is evident that something more direct and prompt in results is necessary than an anticipated compliance with the car service rules. While these rules would direct some 52,000 automobile freight cars to the Ohio-Indiana-Michigan roads, where they are owned and urgently needed, there are some 32,000 additional automobile cars owned by western, southern and eastern lines; these latter cars should not be sent *home* now—they should be sent to this same Ohio-Indiana-Michigan territory. As fast as they are placed at factories they will be loaded and *routed home,* thus bringing about a relocation of cars and at the same time rendering immediate relief to the industry.



New Bosch magneto of radical design change.

Radical Changes Mark New Type B Magneto Made by Bosch Company

The new Bosch magneto known as the "B" type, which was shown at the 1920 shows, marks the first radical change that has been made in magneto design for many years.

These type "B" magnetos are equal mechanically and electrically to any of the types which have preceded them. They are, however, more simple in construction and because of the saving made in the new and novel method of current distribution can be manufactured more readily in large quantities.

The frame of this magneto is cast of aluminium and includes not only the magneto base, but also the pole shoes and the shaft end plate. The armature and interrupter are of the standard Bosch construction and the armature rotates on ball bearings which are packed in grease making it unnecessary to oil this instrument. The distributer member is of a new design and is furnished in both the brush and jump spark types—the jump spark being known as Ed. 1 and the brush type being known as Ed. 2. The distributer rotor is driven by two gears which mesh perfectly, one mounted on the armature shaft and the other on the distributer rotor shaft, this design insures absolutely noiseless operation. The high tension current is lead from the slipring collector brush to the distributer by means of a high tension cable which is fastened to the center terminal upon the distributer block.

Type "B" magnetos are now being sent into the field with two styles of interrupter housing and timing arms, the first the standard Bosch housing and arm, the second with the new style housing and timing arm which consists of a cast arm and band encircling the housing. This housing is perfectly plain, carries no broaching, the band being held tightly in position by a screw which binds its ends together. This screw in turn fastens the ends to the cast arm. This magneto is also made up in a special form for tractor work and is known as the type BT4 which is in all respects similar to the type "B" magneto except that it is provided with adjustable impulse coupling enclosed in a dust and waterproof case.

Cooper With Keystone

M. S. Cooper has severed his connection with the sales department of Willys-Overland, Inc., to become sales manager of the Keystone Motor Truck Corporation, Philadelphia. This organization will manufacture a new 1-ton motor truck to be known as the Keystone truck. Mr. Cooper came to the Willys-Overland Company six years ago, and his employment here has been continuous except for the fourteen months spent in France in the war. Mr. Cooper was commissioned a major in Motor Transport Corps. During his service with the Willys-Overland Company, Mr. Cooper was in charge of the commercial car division of the sales department and more recently was handling quantity sales.

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Successful Truck Selling at Honest Prices

By JOHN NICHOL

President, John Nichol Company, Chicago

THERE is no doubt that motor trucks can be sold successfully at an honest price. Merchandising of hauling units is passing through the same stage as that through which the passenger cars went years ago, that of fictitious values and discounts that tend to fool the buyer.

Practices that are detrimental to good business have been indulged in, more in Chicago than in most cities, but many of the concerns that have used these loose methods have gone out of business, and those that are still practicing them are not making the clean profits to which they are entitled.

It begins to look as though the motor truck business will become stabilized in this section of the country. The successful merchandising of motor trucks must be one of honest value and of satisfactory service. The cost of manufacturing and selling plus a legitimate profit should and will be the future basis of selling motor trucks. There are dealers who have built up their business on the principle of full value for the money without giving discounts and experience proves that this is sound business practice. If all dealers would follow this policy the motor truck purchaser would be able to choose among the various makes of machines without the fear that he is paying more for the same unit than his neighbor. The purchaser of a motor truck, or of any other piece of merchandise, is willing to pay the price that is universally received for the product. It is not so much his desire to buy cheaper than his neighbor but to know that he can buy at the same price. If this policy was universally followed the motor truck business would be on a sound basis. On account of the scarcity of motor trucks at this particular time it seems almost criminal for dealers to quote discounts when it should be a very easy matter to get a full list price, especially as we are unable to deliver promptly some of the machines we have sold.

It was not many months ago that the purchaser of a motor truck could make a very small cash payment, and have time payments extend over a period of 18 to 24 months. However, these long time payments have proved to be disastrous to the dealer. If a minimum cash payment of 25 per cent is received from the purchaser, and deferred payments limited to 12 months the dealers will find that there will be very few motor trucks that will be re-possessed. On the other hand when less than 25 per cent is paid down and payments extend over 15 months the purchaser is in reality securing a new motor truck for less than he could rent one for, and it is a temptation on the part of the purchaser to turn the machine back to the dealer after his busy season is over. This would not be the case, however, if the purchaser pays at least 25 per cent down payment, and deferred payments fall due within a year.

There are dealers who maintain their list prices but go absolutely wild on trade-in values. It is safe to say that when motor trucks are traded in at least 75 per cent of them are ready for the junk dealer. It is not uncommon for a purchaser to have motor truck dealers bidding against each other at a high price for a machine that is virtually worth junk. If dealers would offer the amount of money the motor truck could be sold for less the cost of putting same in repair, less overhead and sales expense, it would not be such a temptation to offer a man a fancy price for a vehicle that is of little value.

In the anxiety to make a large commission many motor truck concerns have sold a 3½-ton motor truck to a customer when as a matter of fact a 1½ or 2-ton machine would have been amply large, with the result that the customer believes that motor trucking does not pay in his business on account of the excessive costs.

Bodies should be provided that will hold the rated capacity of the motor truck, rather than 100 per cent overload. The customer who is intelligently and carefully sold, the one who has his hauling problems analyzed, should shortly come into the market for his second machine. If he is oversold he is liable to become discontented and either contract his hauling or go back to horse-drawn vehicles.

National Movement to Standardize Laws Enjoys Heavy Endorsement

WASHINGTON, D. C., March 19.—The movement, now in full cry, which seeks for uniformity in regulations and directions having to do with the control of traffic in the various cities of the country is serving to bring home to motor truck men the need for a similar organized effort on the part of the industry to secure the adoption of uniform state legislation which places limitations upon motor trucks via restrictions upon weight or capacity, regulations as to tire widths, etc. Up to date, only a small proportion of the states have followed the recommendations of the Motor Truck Division of the National Automobile Chamber of Commerce which has made consistent effort to bring about standardization. One state allows motor truck weights in excess of the maximum fixed by the national chamber but, on the other hand, a great number of states have fixed limits short of the allowances that the chamber has declared to be consistent and conservative. Moreover, the action of several states in providing or threatening prohibitive license fees on motor trucks of heavy capacity as a means of protecting the roads exemplifies a trend toward an unscientific disposition of this issue that renders it all the more urgent that every possible effort be made for uniform legislation. Officials of the automobile chamber have no hope that their recommendations will be embodied in a "model statute" in each state but they do feel that with sufficient agitation many states would be led to "check off' their existing laws against the chamber formula and thus, with the passage of minor supplementary laws to take care of details not covered by existing statutes, something approaching standardization might be attained to the eternal benefit of the industry at large. It is felt that tests and experiments by private interests such as the Mack company, coincident with the investigations by the United States Bureau of Public Roads are affording authoritative data for regulations based on real knowledge of road wear.

Perfects Tractor Corn Husker to Be Robbed by Death of Benefits

For persistency and dogged perserverance as an inventor, it is believed that the honors should go to Robert Meharry of Colfax, Illinois, who has just died after working for twenty-four years upon a tractor corn husker which has proved to be a success although the inventor was not able to witness a demonstration. He commenced working out his ideas in 1896, and was granted a patent two years ago. Shortage of steel on account of the war, delayed the manufacture of working models. The first was completed last fall and given a successful test in a corn field near the home of the inventor. He was too ill, however, to witness the demonstration. His brother will look after the manufacture of the machine.

Ship 100 Trucks a Day

Further evidence of the coöperation of the federal government with state commissions for better county and state roads, is seen in the immense movement of motor trucks into the various states where this work is in progress, or is about to be started. This incessant stream of motor trucks, which is being shipped out continuously from various cities where they have been held in "cold storage," constitutes the surplus stock ordered by the government during the war.

Of the 15,000 military power wagons turned over to the government by the Four Wheel Drive Auto Company, Clintonville, Wisconsin, there now remain more than 2000 machines, as a surplus. These are being shipped out at the rate of 100 per day from storing centers in Chicago, Indianapolis, and Ft. Monroe, Virginia. The effect this fleet of machines, including other of virtually every well known make, will have in the better roads' movement, is easily apparent when it is considered that the total number declared surplus amounts to approximately 25,000.

Ruppel's circus will move about the country this year on a complete fleet of motor trucks of 2½ tons each and trailer attachments.

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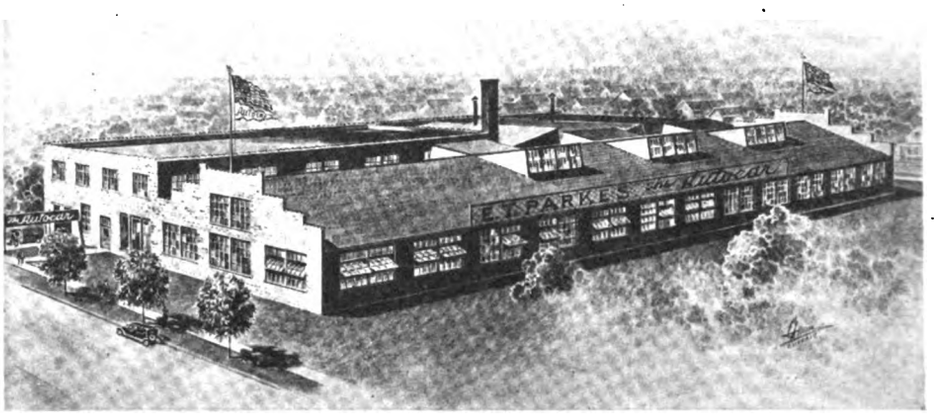
Successful Dealers and Their Plants

XXIII.

E. T. PARKES, THE AUTOCAR, BUFFALO, NEW YORK

DURING the Pan-American Exposition held in Buffalo in the year 1901, E. T. Parkes met Louis S. Clarke, the principal engineer of the Autocar Company, of Ardmore, Pennsylvania, who had driven from Philadelphia to Buffalo over roads which at that time were abominable. One of the statements that Mr. Clarke made was that the troubles he had experienced with the chain drive, had shown him the necessity of a shaft driven automobile, which he subsequently put on the market. Shortly after, Mr. Parkes obtained the agency for the Autocar, having Buffalo territory. Selling automobiles in the infancy of the business was a case of education wholly, seeking to show the general public that an automobile would run successfully, an agent became a missionary as it were. It was just at this time that the Autocar Company introduced the two-cylinder product that has been so successful in the two-ton motor truck that has a national reputation. One of Mr. Parkes' first ideas was that when a purchaser secured an automobile, he should, as with any other commodity, have unrestrained use of his machine; that is, if for any reason the automobile became disabled, he could immediately have it repaired. This necessitated Mr. Parkes having in stock, an almost unlimited number of parts, on account of a large number of Autocars being in operation. He builded better than he knew in the idea of having an Autocar service station, where Autocars could have instant attention when necessary, which became imperative when the Autocar Company in 1906, placed on the market, the 2-ton Autocar. The present



Exterior view of Buffalo Autocar Agency.

Autocar sales and service, authorized to operate in Buffalo and vicinity, is one of the largest and best equipped buildings, for the sale of motor trucks in Buffalo. It is now located at 951 Niagara Street. The old location used for the past fourteen years became too small for this large and growing business, for it must be remembered that Mr. Parkes, has sold the Autocar only, for the past sixteen years.

The Autocar sales and service of Buffalo has a storage space containing 10,000 square feet; a repair shop containing 2,500 square feet; a stock room, office and showroom, two stories high, containing 10,000 square feet of floor space. The service station has a main entrance on Niagara Street and motor trucks enter this way, and there is another entrance on the next block, which is used as an exit.

The repair shop is equipped with all the necessary tools for the rapid repair or rebuild of Autocars, so that owners can have service at the lowest possible cost. The tools are not for the benefit of Mr. Parkes, but to benefit the owner, by having work performed as quickly as possible by modern tools. One tool is a specially built 30-ton press for removing wheels, tubes, large and small bushings, and their replacement. There is also a tire press, so that if a customer has a motor truck in for repairs and needs tires, this service can be applied in the repair shop at once and no further loss of time is experienced by having to go to a tire agency to have the tire applied. This idea has worked out to the satisfaction of Mr. Parkes and Autocar owners. The service that Mr. Parkes has rendered owners has proved beneficial to both Mr. Parkes and the user, so much so, that nearly all of the prominent business houses in Buffalo territory are boosters.

The Autocar has been represented in Buffalo by Mr. Parkes and him alone, since Autocar motor trucks have been built by the Autocar Company.

The Motor Truck Dealers' Association of Buffalo was organized in June, 1919, and Mr. Parkes was honored by being elected its first president. A "Ship by Truck" educational tour was organized and carried out the third week of last September and brought to a successful issue by his untiring efforts and the hard work of the tour committee appointed by Mr. Parkes. One of the reasons for the formation of this

Interior of Parkes' Autocar service station, Buffalo.

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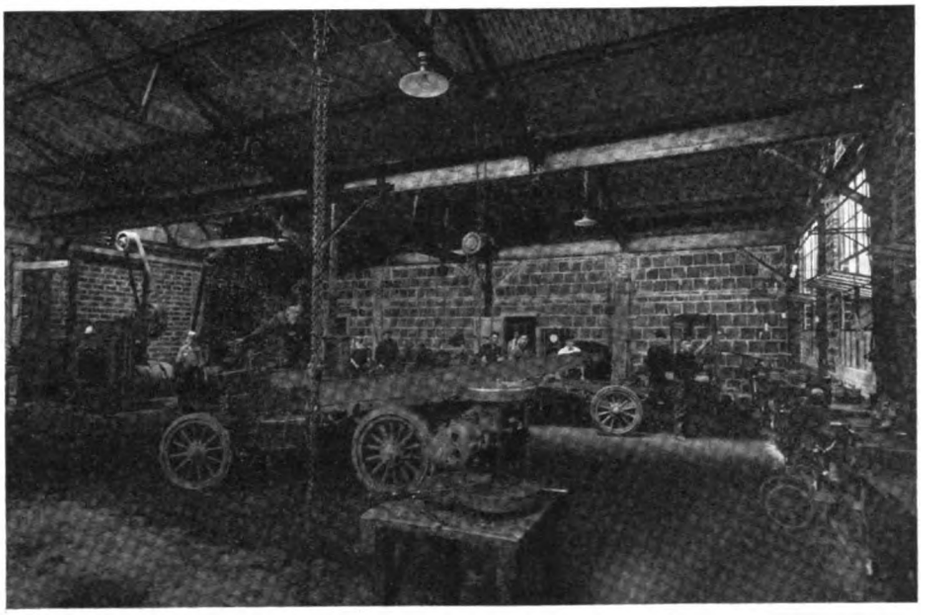
association is for the stabilization of prices in the sale of motor trucks in Buffalo, and to obtain for the purchaser an after-sales service that will exert an influence with the buying public. This will assist in increasing the sale of motor trucks by assuring the prospective purchaser that he can have continuous service with his motor truck, no matter what may befall it. This will prove very beneficial to motor truck dealers of Buffalo.

The system of service that is practiced by Mr. Parkes is to have a large stock of parts on hand at all times, so that no matter how serious the trouble may be with an Autocar, from a small job to a smashup caused by a collision, that may almost completely wreck the machine, to immediately put the motor truck in the repair shop and turn it back to the owner at the earliest possible moment. If the engine needs a complete overhaul, he has in stock a number of completely rebuilt engines, so that he can replace the motor in a few hours and return the motor truck to the owner that he may put it into service at once, instead of waiting until the original motor can be overhauled. The original motor is then overhauled and the cost charged to a rebuild. This process is followed with the transmission, rear axle, rear drive, front axle, steering gear, radiator, magneto, oiler, universal joints, wheels and springs. This system has worked out to the complete satisfaction of Autocar owners in this territory. He also has three service trucks, fully equipped with parts for replacements, hoisting lever, equipment for towing when either front end or rear end is demolished by collision, blocks and tackle when the motor truck is badly mired in mud as is sometimes the case, or car overturned or badly ditched.



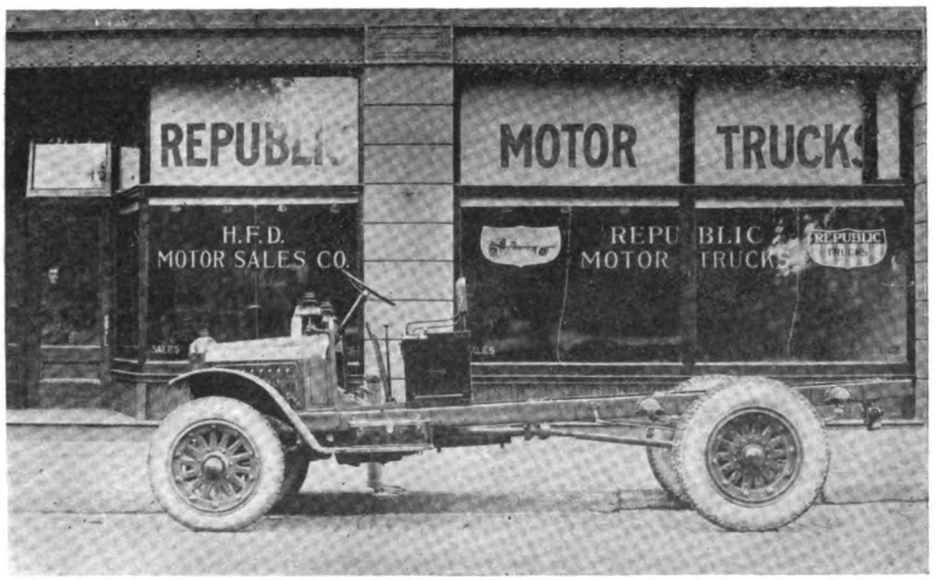
Autocar machine shop, Buffalo.

Going back to the stock-room, one is impressed by the fact that not only a large number of parts are constantly kept on hand, but that the system of taking care of them is almost perfect. The large parts are stored on the floor in suitable racks, and the smaller parts are contained in bins, everything being properly marked, giving the name, number and prices of parts, thus allowing the stock-keeper to make the charge to the customer properly, or to put on the mechanic's work car the name, number and price immediately and repair may be paid or charged as the case may be, without confusion. The tools are kept next to the shop room exit, each in its proper place and each mechanic must deliver a check to the stockman so he may know who has the tool and each man is made responsible for each tool he has given a check for.

XXIV.

H. F. DOUGHTY MOTOR SALES—REPUBLIC

WHEN the world war drew the United States into its vortex, H. F. Doughty had been owner and proprietor of the Bergen Garage, Inc., Huntington, Long Island, for several years. Mr. Doughty decided that he could serve his country to best advantage in the Tank Corps, and he accordingly enlisted in that branch of the service, serving for a year and a half. His proficiency gained for him the post of regimental tank instructor in France in the A. E. F., and from generals down to privates, he lectured on the tactical use of tanks in offensive and defensive combats.



Doughty Motor Sales, of Rochester.

After receiving his honorable discharge from the service last June, Mr. Doughty decided that he would acquire a good territory for an agency from some "live" and hustling motor truck manufacturer. Being full of "pep" and ambition, and well equipped with mechanical and sales experience in both the motor truck and passenger car business, he experienced no difficulty in securing exclusive territory from Republic Motor Truck Company, with headquarters at 204 Court street, Rochester, New York. This territory consists of nine counties in New York State, namely, Wayne, Monroe, Seneca, Steuben, Ontario, Yates, Schuyler, Livingston and Chemung, and one, Tioga County, in Pennsylvania. The official name of the organization which Mr. Doughty created is H. F. Doughty Motor Sales, and his investment is over $40,000.

The organization consists of a sales department, parts department, service station, accounting department and wholesale department. Mr. Doughty possesses un-

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questionable personal ability, but it is his excellent organization which is the secret of his success.

At the head of his sales department, Mr. Doughty placed L. E. Munson as sales manager. Experienced in the automobile business for 15 years, Mr. Munson is well fitted to handle, advise and help six hustling motor truck salesmen. Before they go out to see a single prospective customer, these men are carefully schooled in the economy and operation of the motor vehicle. Weekly sales meetings are held, and these are presided over by both Mr. Munson and Mr. Doughty. Problems, complaints, etc., are taken up, discussed, and solutions found.

In the case of each individual sale or prospective sale, an investigation surrounding the owner's or prospective owner's business is made as to his loading and unloading facilities, type of body required, type of cab, type of tires, the capacity motor truck best suited, etc. Special attention is given to style of body, as this has advertising value. Type of cab is another consideration as satisfaction of the driver is an important part of service and sale, and a good warm cab is recommended. Consideration of the driver is also of prime importance, because if he is uncomfortable, cold or wearied from loading and unloading, he is apt to neglect the proper care of his motor truck, and in addition is liable to sickness.

From 10 to 15 Republics, assorted sizes, are continuously on the floor, except when oversold condition of the factory prevents this.

At the head of the parts department is Robert L. Ahrens. Mr. Ahrens has had many years of experience in this line and is thoroughly conversant with his work. A parts stock of $12,000 is kept. Prompt attention is given all orders and no owner's machine is laid up for want of a certain part.

For service manager, Mr. Doughty brought with him his old Huntington, Long Island, service manager. L. Hinchberger is the man at the head of this very important department. Satisfaction of owners is obtained and held by quick, efficient and honest service. For 30 days each Republic owner is required to turn his motor truck into the service station for inspection. No charge is made for this service, but the owner, in turn, must live up to the recommendations for repairs made by the service department, if it is found these are necessary. Occasionally, a change in drivers is recommended. "Satisfaction Guaranteed" is the slogan of the Doughty service department, and the practice in this direction is carefully carried out.

The wholesale and sub-dealer department is conducted with F. C. Benson as wholesale and territorial sales manager. Mr. Benson has had 15 years experience in the trailer, tractor and motor truck business and is well equipped with the necessary knowledge to successfully handle this end of the business. In seven months' time, Mr. Benson has added 10 progressive subdealers, one for each county of the Doughty agency.

An expert accountant is called in every 30 days to audit the books of the various departments. As Mr. Doughty states, "We know where we stand in each department once each month, and where the weak link is in the chain, if any."

In short, the H. F. Doughty Motor Sales, 204 Court St., Rochester, New York, is an exceptionally live, progressive and successful distributing agency for Republics in this territory—a well organized, hustling, experienced company, whost ambition it is to keep the Republic owners "sold" on motor trucks, as well as to sell motor trucks. In this way only can any dealer be successful.

Already 50 machines have been sold in less than six months, and Mr. Doughty feels sure the 250 mark will be reached in 1920.

Good organization, with an experienced man at the head of each department, who is held responsible for the success of his particular department, is bound to win with a man like H. F. Doughty to guide them.

Burned to Steel's Edge in Desert, Old Wreck Is Doing 40 Miles a Day

Three years ago a Kissel motor truck now being used by a Los Angeles, California, lumber company was lying in the desert an apparent wreck. The Magnet Lumber Company purchased the so-called wreck for $185, which was the cost for hauling it from the desert to the service station. Since then this motor truck has been doing an every-day service, hauling loads of sometimes more than 6 tons and covering an average of 40 miles a day.

F. B. Lyon of the Magnet Lumber Company has the following to say regarding the history of this motor truck and the manner in which the apparent junk pile was turned into a big paying investment.

"You do not often pick up a 4-ton motor truck for $185, but it is doubtful if you would have even offered that much for this one if you had seen it in the condition that it was when we bought it. The machine had been in use for a year or so on the desert, and in some way had caught fire when carrying a highly inflammable load. The motor truck burned literally right down to the steel of the chassis. Even the rubber of the tires was mostly consumed. For a year it lay on the desert, when it became necessary to haul it into Los Angeles in order to settle the matter of adjusting the insurance. We bought it for just the price paid for hauling it in from the desert. We brought it down to our shop and went after it. The motor was hurt very little. The frame was warped and the temper spoiled so we put in a new frame, and new bearings throughout the transmission and wheels. With new tires and a new body, the machine stood us at about $1400 by the time we put it in service.

"That was three years ago, and we would not take $1500 for the motor truck to-day. We have charged depreciation enough against the machine to wipe its cost off our books, and it is apparently as good as it was the day it went into service. It was only rated at 4-tons to begin with, but we haul 5 and 6-ton loads and think nothing of it. It averages about 40 miles a day, and covers 7 miles per gallon of distillate."

One Truck Does Work That 10 Years Ago Required 28 Mules, Et Cetera

Ten years ago it took 28 mules three days to transport a 9-ton boiler 5,000 feet up in the Sierras to the Madera Sugar Pine Mills, 60 miles distant from Madera, California, the nearest railroad point. Recently a 5-ton Federal motor truck performed the same task in one day, despite the prophecies it would never make the steep mountain grades and pitches.

Harvey Shuman, the operator of this unique motor truck system which keeps this isolated camp with its thousands of inhabitants supplied with the necessities of life and power machinery for work, declares that his statement that he could get this huge boiler for use in one of the yards at the camp was laughed at.

The roads were considered treacherous, full of dangerous winding turns, often attaining a grade of 20 per centum. Experienced truckmen who saw the boiler loaded from a flat car to the motor truck phophesied that the trip could not be made, but it actually arrived at the mills, 65 miles up in the mountains without a mishap.

There are many of these donkey engines at the mills in addition to locomotives which are used for hauling timber from the forest to the mills. All of this machinery must be hauled over the mountain roads. The value and economy of the new method, which replaced mule transportation, is strikingly illustrated in this incident.

In order to save the brakes of the motor truck which carried this 9-ton boiler, it was necessary to chop down one of the larger trees and drag it behind the machine whenever a steep grade was reached. In one place the flume, which permits the lumber, cut up, to float down to Madera, had to be cut to allow the motor truck to pass with its huge load. This unusual and tortuous trip was successfully accomplished by Clarence Row, one of the expert mountain drivers of this motor truck line, whose experience on this particular mountain road was to a great degree responsible for the success of the trip.

A fleet of four Federals, one of which has been operating four seasons, running an average of 20,000 miles each year, are used continuously to keep in supplies 800 men in this mountain town for approximately eight months of the year regardless of weather conditions or road conditions, bringing machinery for the mills, and mail, food and clothing for the men.

An attractive poster, showing the various copper-asbestos cylinder head gaskets used on all American passenger cars, motor trucks and tractors, is being distributed by the McCord Company, of Detroit.

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Motor Truck Exports from U. S. Jump to 50 Per Cent Increase

Net gains of 50 per centum in motor truck shipments over the year 1918 are revealed in the totals for the calendar year 1919, compiled by the National Automobile Chamber of Commerce from the monthly statements of the Bureau of Foreign and Domestic Commerce. The curve of increase fell off slightly during the latter part of the year, due to the exchange situation. Heaviest gains for the American products were registered in the non-car producing regions such as South America, the Far East and Africa. The least progress was to be noted in Europe and Great Britain where home manufacturers compete.

The totals for the two years are: 1918, 10,308 motor trucks valued at $26,814,952; 1919, 15,467 motor trucks valued at $35,099,079.

South America increased its demand for motor trucks over 100 per centum, absorbing 796 in comparison with 384 of the year previous. Passenger car gains in this section were also healthy, totalling 9,016 in comparison with 6,782 of the year before. Canada was a large purchaser, taking 2,164 motor trucks in 1919 as against 1,596 in 1918. England's motor truck purchases decreased from 2,080 in 1918 to 890 in 1919. The sale of army equipment accounts for the slump. France and Italy are both restricting the American product so that exports to those countries are falling off, but Belgium, Norway, Sweden and Denmark, whose total purchases from the United States in 1918 were 108 motor trucks, increased to 1,807 during the past year. Exports to Mexico went up over 100 per centum. The Philippines more than tripled their demand for motor trucks, and the shipments to the non-contiguous territories of the United States were six times as great as the preceding year in the motor truck field.

Government Has 49-Section Roadway to Show Effects of Heavy Traffic

State highway departments are vitally interested in the successful outcome of comprehensive experiments and tests now being made by the Bureau of Public Roads of the United States Department of Agriculture. One State engineer recently declared that millions of dollars in his state are involved in the proper design of road surfaces, which makes up one of the problems being investigated by the federal engineers.

The coming into general use of the heavy motor truck has practically revolutionized the science of road building. Big new problems came when loads weighing 10 to 15 tons took the place of vehicles that placed a weight one-fourth as much or less. The roads built 10 years ago were constructed before this fact could be realized—which is one of the reasons why many "permanent" roads have proved to be impermanent.

One of the testing experiments being made by the federal bureau involves the use of a 49-section roadway in the Arlington farm, owned by the Department of Agriculture. Each section was built from a different type of material, or with a different method of construction. The same use is given to each section, so that eventually the type of construction best suited to heavy traffic will prove itself.

Lake and Doty With Sanford

Jo. M. Lake has become associated with the Sanford Motor Truck Company in the position of general sales manager. Mr. Lake was formerly with the sales department of the Chase Motor Truck Company of this city, and latterly with the System Magazine. He spent nearly two years with the engineering corps in France, and upon his return to this country last spring became associated with the Cosmopolitan Magazine. C. F. Doty has been appointed special representative for the company. Mr. Doty was formerly district manager for the Bethlehem Motor Truck Company, in New York and eastern Canada; prior to this time he was associated with the Stewart Motor Truck Company, of Buffalo, and the Studebaker Corporation of America.

Rare Rainbow Color Scheme Graces Truck of Dusky Nigerian Princess

The accompanying illustration is of a motor truck that was recently shipped from Wichita Falls, Texas, to Lagos, Nigeria, and it is the twelfth machine shipped to that port in ten months. This particular motor truck was painted in more colors than could have been found on the famous coat of Mr. Joseph, who was too strong for Mrs. Potiphar. The lettering on the body shows the name of the purchaser, but just what kind of a reigning belle she is has not yet been ascertained.

On February 5 of this year eight motor trucks were being loaded at the plant of the Wichita Motors Company at Wichita Falls. The destinations of these power wagons included Auckland, New Zealand; Pnom-Penh, French. Indo-China; Bombay, India; Chiclayo, Peru; Candia, Crete; Athens, Greece and Tahiti, Society Islands.

Algeria Offers Market for American Motor Trucks of Heavy Capacity

The market for motor trucks in Algeria is a very promising one, since they will have a large employment in supplementing rail transportation. A considerable number of French army motor trucks have been assigned to Algeria and have been employed in moving the cereal crop and for other purposes. Among the French machines are the Rocher-Schneider, Berliet, and the De Dion-Bouton. There is a large number of Fiat motor trucks in use also, which have been turned over by the military authorities. The Berliet 5-ton motor truck is being sold at present at $6,200 and the Fiat 4½-ton at $7,000. There is a local demand for motor trucks of large capacity which would be suitable for long trips into the interior. An American 7-ton motor truck selling at about $5,000 should, at normal exchange, have some sale.

There is quite an extensive use of motor 'busses in Algeria to connect centers of population away from rilroads and also in competition with the railroads. Several large De Dion-Bouton motor 'busses have been imported recently for this service.

There is a total of about 9,000 motor vehicles in use in Algeria at the present time, according to information obtained from official sources. The number in the Department of Algiers is about 4,036, consisting of 3,939 passenger cars (including a few motor cycles), 55 motor trucks and 42 'busses. In the Department of Oran there are registered 3,743 motor vehicles, consisting of 3,691 passenger cars, 38 motor trucks, and 14 'busses. In the Department of Constantine there are 1,231 motor vehicles, consisting of 1,189 passenger cars, 28 motor trucks, and 14 'busses. These figures are only approximate, as there is more or less circulation of vehicles between Algeria and France, the neighboring protectorates of Morocco and Tunisia, and the South Territories.

Wichita "rainbow" painted for African princess.

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Distribution of Motor Trucks

By F. H. PIETSCH,
Manager National Truck Division Packard Motor Car Company

HOW to successfully market both passenger cars and motor trucks through one distributer organization, is a question that seriously affects many dealers at the present time. The first passenger automobiles were of the two passenger buggy type. This increased to five and ultimately seven, and at one period almost every buyer insisted upon a seven-passenger car, mainly because he wanted to get all he could for his money and take his neighbors riding. This indiscriminate method of buying passenger cars has been largely done away with. This is now an era of specially designed bodies to suit the family requirements of each individual purchaser. Motor trucks were also first merchandised in the same casual way.

The most successful distributers in business to-day owe their prosperity to marketing passenger cars, and when some of the large passenger car manufacturers started in on motor truck production, even in a small way, the average distributer looked askance. He probably bought a demonstrator of any old size and did a lot of free hauling in an indiscriminate way, and if he was lucky enough to make a sale, well and good—but he had no constructive selling program. Possibly these conditions prevail in some places now, but the day of motor truck demonstrators has passed.

WHILE a distributer may purchase both his cars and motor trucks from the same manufacturer, he must divide his organization into two distinct branches to successfully dispose of his quota. They must be as marked as railroad passenger and freight departments. Very few men can successfully sell passenger cars and motor trucks. A distributer usually leans towards either one or the other, and in order to balance his organization, he should have a specialist in charge of his passenger department, as well as a thoroughly informed motor truck man at the head of his motor truck department. As motor trucks were of secondary importance in distributers' eyes during the growth of the automobile industry, this branch of the business is one that they have had the least experience with. In the beginning of the motor truck industry the average buyer almost invariably purchased too large a unit for his requirements. When he did unload it, however, he made even a more thorough job of it than the overloading that goes on to-day. With the advent of the light, low-priced unit, almost everyone bought chassis of too light capacity, put attachments on them, and overloaded and overspeeded them to such an extent that their duration of service was far less than it should have been. If a customer comes into a store and asks to look at motor trucks, almost without fail the first question the salesman will ask him is "What size are you interested in?" All that the customer knows about motor trucks is from the innumerable interviews he has probably had—and some of them against his will—with all manner of motor truck salesmen, and if the preponderance of 3-ton propaganda has so instilled itself into this buyer's mind, he will say "A 3-ton unit." Whereas, if an analysis had been made of his requirements, two 2-tons or one 5-ton might have been what he really needed.

Every distributer who is handling motor trucks, even with a very small organization, should have at least one or two men who have made a study of transportation engineering, sufficiently equipped to practically advise a buyer as to what his needs really are, and in so doing conclusively sell him the units that will best fit his business.

The term "Transportation Engineering" may sound very technical, and ponderous to many who have not given it close analysis, but explained in a few words, it is simply the adoption of thorough detailed sales knowledge as practically applied to moving tonnage of all descriptions under varied conditions, at the least possible cost. Many experienced motor truck men have this transportation engineering knowledge, picked up by themselves through years of selling. This knowledge is the basis of successful and continued motor truck business. Salesmen who haven't it, even though they represent a favorably known and well advertised motor truck, are laboring under a severe handicap when they enter into competition with a salesman who is thoroughly informed on transportation engineering. This aspect of motor truck selling warrants serious consideration.

TO market successfully a fair-sized quota of motor truck chassis in an allotted territory you will find three essentials in your business. First, ample capital or banking connections to finance time payments, which are growing more rapidly in the motor truck branch of the motor industry than in the passenger car end. Many motor trucks can be sold to really responsible people providing the payments can be carried over a period of eighteen months to two years. It is obviously impossible for any distributer to tie up his capital in this motor truck paper, be it ever so good. He must, therefore, in order to enjoy the profits on time sales, arrange for sufficient backing with some financial institution.

Second in importance—a distributer must be prepared to service the motor trucks he has sold, and to carry an adequate supply of parts in his stock room to give this service. Many motor trucks to-day are bought solely because the manufacturer, through his distributer has superior service facilities, even though his motor truck may be inferior to that of some others. Service on motor trucks rightly demands more exacting elements than on passenger cars. A motor truck laid up for a part which is not in stock, means an economic loss to the owner.

The third necessary element that enters very largely into the successful distribution of motor trucks, is a distributers' used-truck department. If this is properly conducted on business principles, it is a valuable, as well as necessary adjunct to a motor truck distributer's business.

Used motor trucks are not part of this article as that element of the industry is sufficiently important to be taken up by itself.

Transportation engineering, financing on time-payments, service and a good used-truck department will make any dealer's motor truck branch equally, if not more successful than his passenger car division.

Eastern Farmers Began Motor Truck Buying More Than Five Years Ago

Figures obtained by the United States Department of Agriculture in connection with the investigation of the use of motor trucks by farmers indicate that the rate at which eastern farmers have been adding motor trucks to their farm equipment has increased rapidly during the last three years. Reports gathered by the Office of Farm Management from approximately a thousand farmer motor truck owners in the New England states, New York, Pennsylvania, New Jersey, Delaware, and Maryland during January and February, show that at that time over 80 per centum had owned their machines less than three years. The length of time 955 of these men had owned their machines is as follows: Less than one year, 373; more than one year but less than two, 237; more than two years but less than three, 181; more than three years but less than four, 86; more than four years but less than five, 37; more than five years, 41.

These reports were all from farmers who had purchased new motor trucks for their individual use. Reports on secondhand machines and on motor truck attachments for pleasure cars, as well as motor trucks used primarily for custom work or on regularly established routes, were not included in the count. While it is impossible to determine just how many of the motor trucks which have been in use only one or two years were purchased to replace other motor trucks, worn out or discarded, it is known that a large percentage of the reports covers first experience with motor trucks.

The registrations for 1919 in Massachusetts have been in excess of 177,500 passenger cars and 41,500 motor trucks.

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Progressive Farmer With One Truck Opens Market Closed to Teams

In June, 1914, R. B. Briscoe, of Downey, California, purchased a 1½-ton Federal motor truck and his attempt to solve the local haulage problem was watched with interest by the hundreds of farmers who were beset with the same problem. Up to this time the raising of produce near Downey and marketing it by rail was unprofitable and unsatisfactory because the trip to Los Angeles, the nearest large market, could not be accomplished by teams in one day.

The first year Briscoe marketed his crops in Los Angeles with little trouble, no delay, and at prices that gave him a good margin of profit. He was able with his motor truck to make the round trip in three hours, with the result that he had plenty of time for his farm work. He soon learned that by making two or more trips a day he could market his neighbors' as well as his own crops. The profit of the extra trips more than made up for the labor he hired for his own farm.

The following year he easily made two 30-mile trips each day at an expense of $7.20, including all items and $2.50 a day for himself. This was at the rate of $1.80 per ton, hauling 2 tons on each trip and 4 tons when necessary.

As a result of this one motor truck Briscoe has been able to market the produce of both his neighbors and himself by securing orders from produce men in Los Angeles and other markets and guaranteeing shipments on schedule time. In addition he was able to hunt other markets where the commission men were not so well supplied, such as Long Beach, Pomona, San Pedro and Santa Anna. Briscoe and his motor truck proved to the farmers of his community that the motor truck is the answer to the economical marketing problem.

Crane Handles Wheels

The Atlas wheel crane, distributed by The Thomson Auto Specialties Company, Columbus, Ohio, is useful in garage and service stations where it is necessary to handle the heavy wheels of motor trucks. Without some such appliance as this three or four men must frequently work for an hour or longer, with makeshift tools to remove or mount a heavy motor truck wheel. The Atlas wheel crane, operated by one man, will do the job in one minute, exclusive of time required to jack up the machine and take off hub cap, axle nut, etc. The operation of the crane is extremely simple. Brought up to the wheel, the grab hooks reach in under the fender and grip the rim on either side of the wheel. A turn of a crank is all that is necessary to lift the wheel so that it hangs free. The crane and the suspended wheel are then rolled back from the motor truck. An adjustable stop on the crane holds the wheel in vertical position so that when repairs or adjustments are completed, the wheel is slipped back into place in the same easy fashion and the grab hooks released.

Motor 'Bus Operation in Chicago

By ROLAND R. CONKLIN

President, Chicago Motor 'Bus Company

IN connection with the traction situation in New York and throughout the country generally, the appearance recently on the streets of Chicago of a new type of motorbus is of more than local interest. This omnibus has a covered upper deck practically encased in glass and provides sixty seats protected from the weather instead of the twenty-four or twenty-six downstairs seats in the old style 'bus.

As a matter of fact, the new 'bus differs but slightly in its physical construction from those previously operated in Chicago. However, the difference, though slight, is tremendously important. It means comfortable seats on top despite chill winds, sleet, snow and ice, and more than doubles the seating capacity thereby greatly increasing the earnings during bad weather as well as increasing the comfort of thousands of passengers, without appreciable increase in operating or maintenance of costs. Like the older type of 'bus, the new vehicle has front-wheel drive, the floor on a level with the curbing for convenience and speed in taking on and off passengers and the covered straight stairway in the rear which is safer than the winding and exposed one. Instead of the twenty-five enclosed downstairs seats on the older style 'bus available in bad weather there are sixty, which means that had the newer style 'bus been in service from January 1 to August 31, 1919, instead of the old ones, 733,557 more passengers would have been carried, meaning an approximate increase of earnings amounting to $73,355. During that period of time the Chicago Motor 'Bus Company carried in its 'buses of fifty-one passenger capacity, —twenty-five seats below and twenty-six above—4,106,208 persons on 58,027 round trips. When the company began business on March 25, 1917, it had nine 'buses and averaged daily 2,229 passengers. This number increased with the addition of more 'buses and with the growth of the motor 'bus idea of travel until in August, 1917, it was 18,034. The cost of operating this fifty-one passenger 'bus averaged in December, 1917, twenty-nine cents a mile. Designers of the sixty passenger closed top car declare that the increase in operating cost is negligible.

The designers based their general ideas of construction on the old 'bus which in itself is radical when it is realized that all the other motor 'buses in operation in the United States seat only forty-four passengers. The fifty-one passenger 'buses had their test and proving by 3,500,000 miles of actual service in Chicago and this experience was utilized to great advantage by the designers of the new 'bus. The length of it is twenty-five feet and six inches; the width, seven feet and six inches, while the height from the roadway, when loaded, is thirteen feet. It has a wheel base of 176 inches; height of lower deck from roadway twelve and three-quarters inches; height of upper deck from roadway is eighty-six inches when loaded. Both decks are lighted by a generator driven by the engine whereas the heat is supplied by deodorized exhaust gasses from the engine. The front tires are 6-inch single style and the rear ones are double with a total tread of 12 inches. The power plant is the A M B C standard type of front-wheel drive, made into a detachable unit with constant mesh transmission. The brakes on the rear wheels are placed so as to be applied approximately to 500 square inches of braking surface.

However, the covered upper deck with its forty-one windows is the principal feature. Of course, this is made possible by the front-wheel propulsion and consequent low hanging body enabling the cover to easily clear elevated structures under which it must pass. The Chicago company expects to install these vehicles as rapidly as they can be built. It is hoped to have a line of them running on the south side of Chicago by spring. Designers of this 'bus believe it is the last word in 'bus construction and that it offers a solution to traction difficulties. Just at this time when the motor 'bus is coming to the fore as the most feasible means of city transportation the operation of this new type will be watched by motorists all over the country with great interest.

United States Tire Company Raises Six Men to New High Positions

Substantial promotion has come to six of the oldest executives in the sales department of the United States Tire Company through the creation by the company of six important new positions. The entire country has been divided into six divisions each to be under the direction of a sales manager, working directly under General Sales Manager George S. Shugart.

The six places will be filled as follows:

New England sales manager with headquarters at Boston, E. H. Kidder, formerly district manager at Boston; eastern sales manager with headquarters at New York, E. S. Roe, formerly district manager at New York; central sales manager with headquarters at Detroit, Thomas R. Burton, formerly district manager at Kansas City; western sales manager with headquarters at Chicago, P. C. Anderson, formerly district manager at Chicago; southwestern sales manager with headquarters at Kansas City, Harry H. Hubbard, formerly western manager for distributers' brands; and southern sales manager with headquarters at Atlanta, William C. Price, formerly district manager at Atlanta.

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Highway Bond Issues as of March 1, 1920

Grand Total of Good Roads' Aid Equals $1,026,895,528 Since January 1, 1919

THE following is a summary of state and county highway bond issues as of March 1, 1920. This list includes only those bond issues authorized since January 1, 1919, with a few exceptions (both state and county) which were authorized prior to 1919, but under which practically no expenditure has been made to date. Bond issue projects are listed as proposed only when election dates are actually set.

State.	Amount Proposed.	Date of Election.	Amount Authorized.	Date Authorized.
ALABAMA:				
1920—State	.....	.....	$25,000,000	Feb. 16
Jefferson Co..	.....	.....	5,000,000	Feb. 16
Totals	.....	.....	30,000,000	
ARIZONA:				
1919—9 counties....	.....	.....	8,800,000	
Total	.....	.....	8,800,000	
ARKANSAS:				
1919—3 counties....	.....	.....	4,900,000	
Total	.....	.....	4,900,000	
CALIFORNIA:				
1919—State	.....	.....	40,000,000	July 1
18 counties...	.....	.....	28,435,000	
1920—Colusa Co....	$1,000,000	March	.....	
SantaBarbaraCo.—				
Lompoc Dist.	400,000	Feb. 3	.....	
Totals	1,400,000	.....	68,435,000	
COLORADO:				
1920—State	25,000,000	Nov. 2	.....	
Total	25,000,000	.....	.....	
DELAWARE:				
1919—1 county	.....	.....	500,000	
Total	.....	.....	500,000	
FLORIDA:				
1919—7 counties....	.....	.....	2,615,000	
Total	.....	.....	2,615,000	
GEORGIA:				
1919—41 counties...	.....	.....	15,375,000	
Total	.....	.....	15,375,000	
IDAHO:				
1919—21 counties...	.....	.....	7,873,000	
1920—State	2,000,000	Nov. 2	.....	
Totals	2,000,000	.....	7,873,000	
ILLINOIS:				
1918—State	.....	.....	60,000,000	Nov. 5
1919—12 counties...	.....	.....	8,992,845	
1920—Franklin Co..	900,000	Feb. 17	.....	
Iroquois Co.—				
ChebanseTwp.	.....	.....	60,000	Jan. 17
Kane Co....	1,500,000	Feb. 10	.....	
Peoria Co....	1,700,000	April	.....	
Totals	4,100,000	.....	69,152,845	
INDIANA:				
1920—TippecanoeCo.	.....	.....	860,000	January
Total	.....	.....	860,000	
IOWA:				
1919—13 counties..	.....	.....	18,475,000	
Total	.....	.....	18,475,000	
KANSAS:				
1919—1 county	.....	.....	50,000	
1920—State	60,000,000	Nov. 2	.....	
Totals	60,000,000	.....	50,000	
KENTUCKY:				
1919—9 counties....	.....	.....	2,730,000	
1920—Fayette Co...	.....	.....	100,000	
Totals	.....	.....	2,830,000	
LOUISIANA:				
1919—15 parishes...	.....	.....	7,350,000	
1920—Cameron Par.	.....	.....	417,000	
ClaibornePar.	.....	.....	500,000	
Totals	.....	.....	8,267,000	
MAINE:				
1919—State	.....	.....	8,000,000	Sept. 8
Total	.....	.....	8,000,000	
MICHIGAN:				
1919—State	.....	.....	50,000,000	Apr. 7
6 counties....	.....	.....	3,100,000	
1920—CheboyganCo.	50,000	Apr. 5	.....	
Montcalm Co.	500,000	Apr. 5	.....	
Totals	550,000	.....	53,100,000	
MINNESOTA:				
1919—17 counties...	.....	.....	12,800,000	
1920—State	100,000,000	Nov. 2	.....	
Totals	100,000,000	.....	12,800,000	
MISSISSIPPI:				
1919—54 counties...	.....	.....	15,848,000	
1920—State	25,000,000	No elect.		
Totals	25,000,000	required	15,848,000	
MISSOURI:				
1919—38 counties...	.....	.....	13,919,600	
1920—State	60,000,000	Nov. 2	.....	
Barton Co...	750,600	Feb. 10	.....	
Dunklin Co..	.....	.....	1,200,000	Jan. 20
Saline Co....	1,000,000	Mar. 9	.....	
Totals	62,550,000	.....	15,119,600	
MONTANA:				
1919—34 counties...	.....	.....	6,283,000	
1920—State	15,000,000	Nov. 2	.....	
Auster Co....	350,000	Apr. 23	.....	
MusselshellCo.	300,000	Jan. 13	.....	
Sheridan Co.	200,000	Apr. 23	.....	
Totals	15,850,000	.....	6,283,000	
NEBRASKA:				
1919—Douglas Co..	.....	.....	3,000,000	June 24
Total	.....	.....	3,000,000	
NEVADA:				
1919—State	.....	.....	1,000,000	
Washoe Co..	.....	.....	200,000	
Totals	.....	.....	1,200,000	
NEW MEXICO:				
1919—Chaves Co....	.....	.....	200,000	Sept. 2
1920—State	2,000,000	Nov. 2	.....	
Totals	2,000,000	.....	200,000	
NORTH CAROLINA:				
1919—52 counties..	.....	.....	13,459,635	
Total	.....	.....	13,459,635	
OKLAHOMA:				
1919—4 counties....	.....	.....	1,214,000	
1920—Bryan Co....	325,000	Mar. 16	.....	
Choctaw Co..	325,000	Mar. 9	.....	
Oklahoma Co.	750,000	Mar. 30	.....	
Wagoner Co.—				
3 Twps.	.....	.....	83,000	
Totals	1,400,000	.....	1,297,000	
OREGON:				
1919—State	.....	.....	10,000,000	*
RooseveltHwy.	.....	.....	2,500,000	June 3
25 counties...	.....	.....	9,516,704	
1920—Lane Co.....	2,000,000	May	.....	
Totals	2,000,000	.....	22,016,704	
PENNSYLVANIA:				
1919—State	.....	.....	60,000,000	Nov.
1919—26 counties...	.....	.....	16,161,945	
1920—Clearfield Co.	1,000,000	May 18	.....	
Erie Co.	.....	.....	56,000	Feb.
Indiana Co...	1,000,000	May 18	.....	
Burrell Twy.	64,500	Feb. 17	.....	
Somerset Co.	1,000,000	May 18	.....	
Totals	3,064,500	.....	76,217,945	
SOUTH CAROLINA:				
1919—14 counties..	.....	.....	8,560,000	
Total	.....	.....	8,560,000	
SOUTH DAKOTA:				
1920—CoddingtonCo.	2,000,000	May	.....	
Total	2,000,000	.....	.....	
TENNESSEE:				
1919—32 counties...	.....	.....	7,385,000	
1920—Dyer Co.....	350,000	Mar. 6	.....	
Giles Co.....	350,000	Jan. 31	.....	
Totals	700,000	.....	7,385,000	
TEXAS:				
1919—118 counties..	.....	.....	68,708,000	
1920—Coryell Co...	1,250,000	Feb. 21	.....	
Totals	1,250,000	.....	68,708,000	
UTAH:				
1919—State	.....	.....	4,000,000	
4 counties....	.....	.....	2,766,000	
1920—Carbon Co...	150,000	Feb. 14	.....	
Totals	150,000	.....	6,766,000	
WASHINGTON:				
1920—State	30,000,000	.....	9,535,000	
1919—8 counties....	.....	Nov. 2	.....	
Kitsap Co....	350,000	Apr. 1	.....	
Pacific Co....	162,000	Mar. 9	.....	
Totals	30,512,000	.....	9,535,000	
*No Elec. Req.				
WEST VIRGINIA:				
1919—19 counties..	.....	.....	8,426,000	
1920—State	50,000,000	Nov. 2	.....	
Boone Co.—				
Scott Dist..	142,000	Jan. 27	.....	
Wash. Dist.	146,000	Jan. 6	.....	
Greenbrier Co.—				
Ant'yCrk.Dst.	27,800	Mar. 16	.....	
Frankf'dDist.	41,500	Feb. 16	.....	
Marshall Co.—				
Clay Dist...	200,000	Mar. 2	.....	
Frnklin. Dist.	170,000	Mar. 2	.....	
Taylor Co....	1,000,000	Mar. 22	.....	
Totals	51,727,300	.....	8,426,000	
WISCONSIN:				
1919—18 counties...	.....	.....	36,755,000	
1920—Calumet Co..	.....	.....	132,000	
Total	.....	.....	36,887,000	
WYOMING:				
1919—State	.....	.....	2,800,000	Apr. 26
Total	.....	.....	2,800,000	
Total authorized to Dec. 31, 1919	.....		$602,233,729	
Total authorized during 1920 to Mar. 1	.....		33,408,000	
Total proposed	391,253,800		.....	
Grand total	$391,253,800		$635,641,729	
Grand total (proposed and authorized)				$1,026,895,529

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Trucks in the Logging Business

By CAPTAIN JOHN B. WOODS, A. E. F.
Transport Corps and United States Forestry Bureau

NOWADAYS one sees a great number of motor truck advertisements that feature the business of hauling logs Off hand it might be said that probably there are two good reasons why the magazine cuts show so many stout motor trucks loaded with great logs, with dark forests in the background. One reason is that logging is a spectacular and more or less herculean task, demanding strength and stamina from man and beast and machine. The other is that people who build motor trucks are coming to appreciate the fact that there is a great and growing call for motor trucks from lumbermen, and so they use actual photographs of performance to interest other potential users. Log-hauling certainly tests the capabilities of any motor truck, but many good machines have stood the tests with credit, and in so doing they have furnished excellent material for advertising men to work with. Also a new broad market has been opened up to the power wagon.

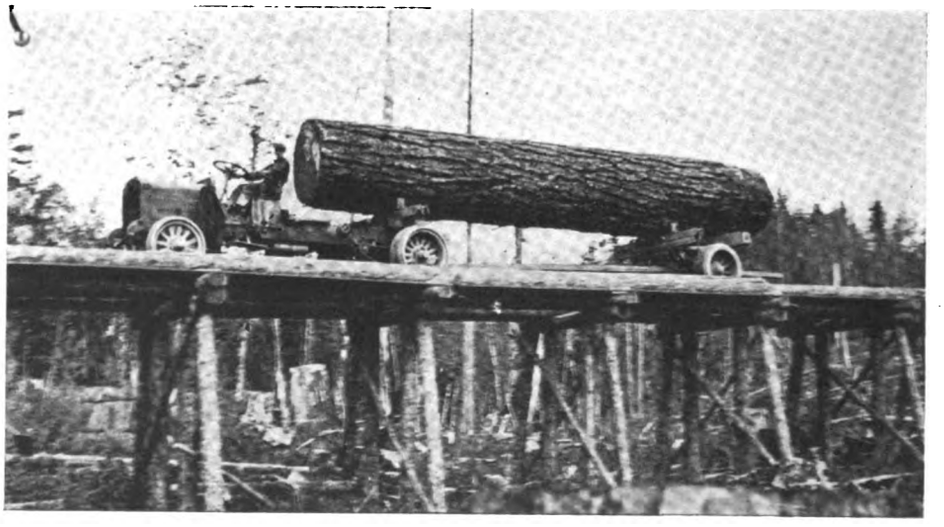
Five years ago there were comparatively few motor trucks engaged in the log woods. Retail lumbermen used them with success, and numerous wholesalers and manufacturers of lumber and timbers found profit in their use. Reports came in from certain widely separated regions to the effect that a new mode of long transportation was being tried with considerable success. A few loggers on the western coast were using motor trucks to handle the giant fir trees to mill, often building miles of plank roads at great expense, and making profit out of the scheme because they operated in dense stands of timber where the yield per acre was often one hundred thousand board feet of lumber.

IN thickly settled parts of the country, as for example the northeastern and Lake States, mill men were able to send their motor trucks out over the well-built roads to pick up logs from roadside tracts, and found that motor power was more efficient than horse power. But the question of roads was perhaps the most important consideration in those days, and in many parts of the land there were no highways sufficiently well built and maintained to justify the use of heavy motor equipment. Some people attempted to go ahead and log with gasolene regardless of the road problem; and in certain instances they were disappointed with their results. Particularly was this true in the southern lumber producing region, where population was not dense and where earth highways were dependable during dry weather and distinctly poor at other times. The usual method of road management in those states was to go out with graders in the spring and put up an earth highway crowned with loose dirt. Traffic would pack this material into a fair highway for ordinary loads and during the summer months the farmers and lumbermen could get about without difficulty. But with the coming of torrential rains such as are characteristic of the South the earth was washed away, and during the winter months every road was a succession of gullies and mudholes. The use of heavy motor trucks served to ruin these roads even before the rain came.

Where gravel was available the situation was not so bad, but even then there was not much profit in motor hauling. One reason for this was the fact that few people understood the science of road building. Proper drainage was overlooked; the ditches were cut along both sides of a pike whenever the nature of the ground permitted, but often were too shallow to drain the crowns, and if ledges intervened the ditches were omitted entirely. Depressions naturally served as catch-basins, with water coming in from higher ground, and often no culverts were provided to drain such spots. Millions of dollars have been wasted in expense of surfacing with gravel under the mistaken theory that a dirt dump, practically undrained and imperfectly packed will endure under heavy traffic if it is covered with three or four inches of gravel. In mountainous country, where nature has founded every road upon solid rock, the gravel surfaces have withstood motor truck logging to a remarkable degree, but generally speaking the old-time roads were not suited to such pounding and did not endure.

BUT five years have brought about great changes. Owners of automobiles and motor trucks have demanded better roads, and in many states they have been secured. Rock bottoms are coming to be appreciated as the first requisite in construction, and the many different systems of surfacing are being tested even in the places where people are few and none too wealthy. Trunk lines naturally have come first, to connect principal cities throughout the South and West. And when the trunk road comes the lumberman can afford to consider motor logging in earnest, for if he is sure of good roads in all kinds of weather between the larger towns of his locality he does not hesitate to build short stretches of rock or plank to connect his timber tracts with these main lines of communication. The past year was the worst season for logging in a decade in the South, because of abnormal rainfall, but even at that there was a fair volume of motor trucking carried on by lumbermen.

PARALLEL with the development of highways during recent years there has been perfecting of motor trucks by manufacturers, with respect to adapting them to specific uses, such as logging. Engineers have come to realize that every business has its peculiar requirements, and that these needs often vary according to local conditions. To cite an outstanding example there is the difference in logging methods as between New England and Washington. The small timber of the North east must be handled in such a manner as to bring in to mill at every trip a great number of logs, and even a load of thirty logs may not yield more than one thousand feet of lumber. But out on the Coast a single log may produce two thousand feet or even more. And of course its weight is so great as to constitute a problem in loading that will call for expert treatment. Recently there have been designed a number of devices for utilizing power from motor truck motors to roll heavy logs aboard, and such equipment is welcomed by loggers, who otherwise must keep teams and loading crews in the woods to do the work. The motor truck which



Truck and trailer doing duty in modern logging.

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works in Massachusetts should be built with broad bunks to hold many pieces, but the machine which carries but one log at a time should be sturdy and powerful without regard to width of bunks. These are extreme cases but there is a principle involved that is worthy of attention.

THEN there is the matter of trailers. Often it is impracticable to carry enough volume upon one frame to justify the use of a big motor truck. The ground may be so soft and the distances so great that rock or plank roads are absolutely out of the question. The experience of the Forestry Troops in France indicated that motor logging was most successful when trailers were used. These trailers were of many types, ranging from specially designed vehicles brought from America to converted log-wagons rebuilt between suns in the blacksmith hovels of the lumber camps. And almost without exception they worked satisfactorily. By using several trailers, loading in the woods was facilitated; a string of loads was kept upon the road most of the day, and another string always was in process of loading in the forest. Motor truck power was utilized at its fullest capacity. Each machine was equipped with bunks so that enough weight could be placed upon it to give the necessary traction, and then the additional weight of timber was hung on behind in the form of trailer loads. And if a bad spot was encountered, where the motor truck could not make headway with its entire load, a cut was made, and the driver went ahead with as much as he could move, and when he reached good ground he uncoupled and went back for those left behind. Some of the tractors were equipped with winches and steel lines, and the driver negotiated mud and sand by letting out his line until he reached solid ground, whereupon he wound it up again and pulled his trailers up to him, after which he proceeded in close-coupled formation. Experience in this country has shown the worth of trailers in logging, just as over in France. Motor equipment is profitable when it is kept busy at full capacity, and they centainly aid in the realization of this aim.

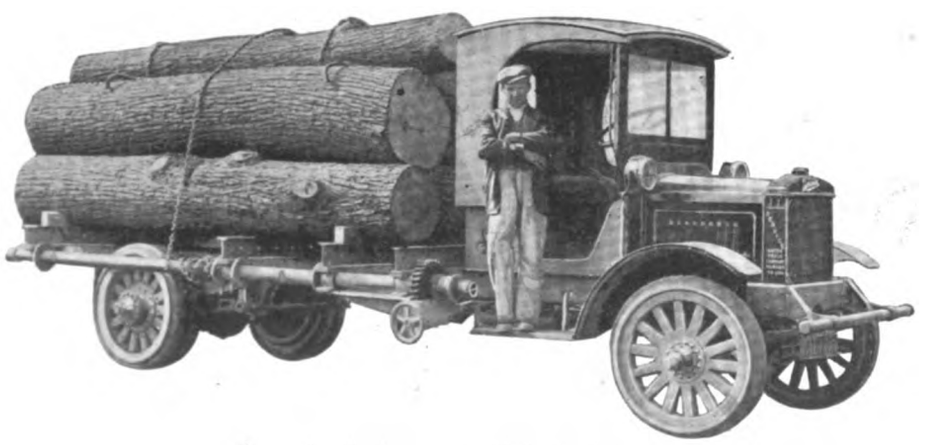
In the woods there are many severe conditions to be encountered. The motor truck that makes good must be mechanically sound and capable of withstanding hard knocks, for green logs are heavy and have the unhappy faculty of breaking loose occasionally and falling against wheels. And often they come down with great force upon the bunks when being loaded with overhead cranes. Great power is necessary to negotiate steep slopes and to pull out of mud-holes. And because the business of supplying raw materials to mills is rather a hand-to-mouth proposition, with small reserves of logs the rule rather than the exception, the motor trucks that log must be on the job at all times and rarely in the shop.

Lumbermen have been obliged to learn motor truck-logging as a new business. They have advanced from the ox-team stage to the railroad age, accumulating experience and wisdom. Now they are studying the motor truck and its many relations; tractors and traction engines and caterpillers. And naturally, considering the hardships of their business they are impatient of indifferent performance. Motor equipment costs money, more money than many men can afford to spend without immediate return in the form of operating profits. And occasionally they take the view that the motor trucks they buy should go ahead and save them money without any further help or study on their parts, which of course is hardly fair to the machines or their builders.

THE connecting link between these builders and the buyers is the dealer, the local man who goes to the logger and sells him a motor truck or a fleet of motor trucks. And it is in this work of distribution that much improvement can be made. As a rule the local man understands the many different kinds of business carried on in his territory; that is, he has a general knowledge of what conditions are to be met in each industry, and certainly he should know a great deal about the conditions of the roads roundabout him. But specific knowledge of the problems confronting any man in a given kind of work is a thing that usually can be gained only by first hand observation. And often it is best obtained by sending a machine out to the job to work for a day or two or longer and watching it while it operates. The engineers at the factory are forever improving their product and working to adapt it to a multitude of different kinds of tasks, and in the same way the dealers should be trying to extend this same service to the men who buy the goods to use. Many of them do this, and profit thereby, but a few are more interested in the sale and the dealer's profit than in continuous performance under conditions that are out of the ordinary. And logging is out of the ordinary. The use of motor trucks on good roads and city streets for general hauling of merchandise and commodities has reached such a point of development that there is a great store of experience on hand from which to draw.

IF John Smith is not getting the best of results he consults the dealer and he refers him to Bill Jones, who is in the same business. And Bill Jones goes into details and they learn what is wrong with their methods. But the loggers often are miles apart, with different conditions to pester them. And the little things often are responsible for success or failure in the moving of logs. Half an hour lost in the woods in putting on each load may run the cost up to such a figure that the boss soon throws up his hands and sells his machine at half what it cost him and says "Never again," when the motor truck is not at all at fault. So the selling of a logging machine should mean more than delivering the machine and training a driver it may actually mean studying the science of logging engineering in the woods with due regard to such details as loading logs, binding of loads, road building, utilization of trailers: and with the eye fixed on the main consideration of keeping the machine everlastingly on the move between woods and mill. Perhaps the outlay of time would cause the average busy dealer to hesitate and concentrate on people nearer the office, but there is the possibility of one successful sale bringing many in its trail. For lumbermen are always on the lookout for new ways of saving money and they will travel farther to hear a man praise a new method that has made good than they will to watch him tear his hair. There are many groups of lumbermen who make a practise of exchanging cost data and visiting each others' operations for the purpose of keeping their methods up to the level of the best. And when they see something that is making good with one of their number they try to copy it. If it is not to be copied they buy the necessary equipment outright.

With all due respect to the laboring man, and partly because he is so scarce, this may be said to be the age of the engineer. And of course the gasolene motor is the engineer's standby. One scarcely can mention a modern industry that does not offer a broad field for the technically trained man who can apply motive power to the movement of goods. And the logging game is no exception. Usually the logger is too busy to go to the motor truck builder, but the latter must find it profitable to take the initiative and go even farther than he has in the years just passed. Whether the work is done by dealers or direct from factories probably does not matter so much, so long as the development goes on.



Amos log loader great aid in lumber camp.

The American Legion has organized a Motor Transport Club in New York City.

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Hammer Silences Horn in Horse Camp

East and West Arrayed Against Each Other in Efforts to Pull Old Dobbin from Hall of Fame into Modern Transportation Activity

IN response to an invitation from certain interests which, on January 24, 1920, had organized a horse association under the laws of the state of Illinois, in opposition to the Horse Association of America, a national association which had been incorporated on October 25, 1919, under the laws of the state of New York, a delegation from the latter attended a conference at the LaSalle Hotel in Chicago on February 4, 5 and 6, 1920. The object of the conference was to bring about unity and harmony. Though the only suggestion of faction or division in the ranks of those interested in the horse came from Chicago, the national association accepted the invitation and the delegation was headed by its president, Fred M. Williams, of New York.

At this meeting the Illinois association presented the following proposition:

1. That the New York association adopt as its by-laws the by-laws of the Illinois association.

2. That the office of the secretary be located in the city of Chicago, and that the annual meetings of the organizations be held in Chicago.

3. That F. M. Williams, the present incumbent, shall be president.

4. That the secretary shall be elected by the board of directors.

5. That the board of directors shall be selected as provided by the by-laws, not more than two directors representing any one industry, and that the western organ-

UNABLE to accept the above proposition, which in effect called for an abandonment of their association, the representatives of the national association, with headquarters in New York, rejected it and submitted the following proposition:

1. The name of the association shall be the "Horse Association of America, Inc."

2. That a board of 36 directors be elected at a joint conference which shall be representative of all the interests geographically and by trade or industry.

3. That an executive committee of 6 men be selected by and from the board of directors, three of whom shall be selected from the West.

4. That alternate meetings of the executive committee be held respectively in the cities of New York and Chicago.

5. That the headquarters of the association be maintained in the City of New York, and that a headquarters be established and maintained in the City of Chicago to be known as headquarters of the western department.

6. That the question of the financial policy of the association be decided by the executive committee of the board of directors.

7. That a committee of six be appointed, three from the East and three from the West, whose duty it shall be to revise the constitution and by-laws of the association.

This proposition was rejected by the Illinois association, and there being no prospect of an amicable agreement, Fred M. Williams, president of the Horse Association of America, the original organization, addressed the representatives of the Illinois association as follows:

"The Horse Publicity Association of America was created under the laws of the state of New York on October 25. As its name implies, it was a national association devoted to the interests of the horse. In perfecting the organization, we had the coöperation of representatives from Chicago, Denver and other sections of the West. The Chicago delegates present were Messrs. Dinsmore and Goodnow. They and other western delegates not only participated in the proceedings, but suggested the names of directors and officers who were elected. Western representatives were also on the committee on constitution and by-laws and recommended the adoption of the by-laws under which our association is functioning and a copy of which you have considered and criticised.

"WHEN these gentlemen returned to Chicago, an organization was formed in your city known as the 'Chicago Local of the Horse Publicity Association of America.' We then had a national horse association and a Chicago local of that association.

"On December 4, in response to an invitation from the Chicago local, a delegation of the national association attended a meeting in Chicago for the purpose of aiding in arousing interest in the horse interests in general and the Chicago branch in particular. During that meeting certain suggestions were made by Chicago men affecting the name, number of directors, etc., all of which were accepted and promptly acted upon by the national association, the name being changed to the Horse Association of America.

"Up to the time of the meeting in Chicago, harmony existed and bright prospects prevailed. Then came the proposition to make Chicago the headquarters of the association. Then was heard for the first time the demand that the men who had brought the Horse Publicity Association into being should yield to the gentlemen from Chicago and abandon the headquarters in the state of New York under whose laws the association was incorporated.

"The officers of the association from their headquarters in New York had communicated with horse interests in every section of the country. The responses were prompt, numerous and encouraging. There could be no mistaking the signs. Public interest in the horse had been aroused. The various allied interests were quick to give expression of approval. A vast amount of publicity for the horse was obtained, one clipping bureau alone transmitted notices which by actual measurement showed two thousand inches of the highest class of publicity in the public press. We received inquiries from north, south, east and west. Men living as far west as Portland, Oregon, applied for membership. The movement was gaining momentum daily. There was every reason to rejoice that at last, after years of neglect, the horse was to be restored to his proper place in the industrial, agricultural and commercial fields.

"Then came the first serious blow to the cause. Without just cause or provocation and while the national association was planning for the establishment of western headquarters in Chicago, certain individuals living in Chicago hastily organized an independent association under the laws of the state of Illinois without notice to the national association which had been laying the foundation for a thorough organization in every state in the Union. Bear in mind that the leading spirits in this Chicago movement to undermine and destroy the national association were the very men who had participated in the organization of that association, and who by every rule of manly conduct were pledged to its support. Not only did they abandon the ship just as it was started upon its voyage with every prospect of success, but attempted to scuttle it with false and malicious propaganda. Though its name was the Horse Association of America and its directors were drawn from widely separated sections of the country, they proclaimed in public prints that the association created under the laws of the state of New York was local in character.

"THE fact that the very man who vouched for the truth of this audacious misrepresentation was the very one who suggested the names of the western directors as well as that of the treasurer, who is a resident of Kansas City, speaks for itself.

"Our delegation from headquarters in the city and state of New York came to this conference in the hope that the bolting interests in Chicago had not gone so far that it would be impossible for them to return to the fold and continue the work in the interest of the horse. We came prepared to provide for the establishment of western headquarters in Chicago—a plan that had been discussed from the very inception of the movement. We came in a spirit of fraternity to do everything short of humiliating self-abasement to insure unity and promote a spirit of friendly coöperation. With no selfish desire or mercenary motive, I have endeavored as president of the association to give due recognition to every section and every interest. Plans have been completed for a subsidiary organization in

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every state in the Union. It has been our purpose to include in membership of the association every horse breeder, every horse owner or user and every associated or allied industry willing to join with us in the great work which we have undertaken. As an American association we recognize no right of dictatorship in any city or interest, and the city or interest that attempts to make the vast horse interests subservient to its local desires or ambitions is unworthy of the cause.

"The Horse Association of America of which I have the honor to be president, will deeply regret any hostile or rebellious act on the part of men who should give the movement loyal support, but it will permit neither hostility nor rebellion to drive it from its course or lead it from the path of duty. The work of rehabilitating the horse will continue. Our efforts to obtain fair treatment for the numerous and important industries which are supported by the horse must not lag. The work upon which we have entered shall not be abandoned. We want your coöperation. Our hand will be extended in welcome to all who come as friends of the horse. As for those who attempt to subordinate this great national movement to their personal interests, they mistake the spirit and under-estimate the strength of our association when they attempt through coercion to force it to surrender.

"This statement is respectfully submitted to all who are interested in the horse.

"It is sincerely to be hoped that no one may be misled by the unwarranted propaganda from Chicago, the only effect of which is to weaken the cause by a division of the forces which should be united.

"On the statement of facts here presented, the Horse Association of America, with national headquarters in New York City, confidently expects your hearty coöperation and support."

Endorses Rural Express

Holding that it is an agency whose value extends to both producer and consumer, the transportation committee of the National Association of State Marketing Officials, at a meeting recently held in New York City, placed an emphatic endorsement on rural motor express by recommending to the various states that they encourage the movement.

Points favorable to rural motor express which were emphasized at the meeting were:

It divorces the farmer's transportation problem from that of production.

It brings a larger, fresher and ofttimes cheaper supply of farm products to the consumer.

It is a means of reducing the cost of living, because it eliminates waste and duplication of work, and makes profitable the marketing of small quantities of foodstuffs.

The Jacksonville, Illinois, Automotive Dealers' Association, recently organized, has been incorporated.

Dealers Lose Discounts in Tardy Freight Pace

DELAYS ARE CAUSE OF MANY DISPUTES

The transportation situation is a heartbreaking one for dealers in all lines, with a keen demand for spring goods being offset somewhat by inability of the retailers to get the goods with which to supply this demand. If a shipment reaches a retailer around Chicago a month after it is shipped by a manufacturer in the East, the dealer may consider himself fortunate. This condition is true even when there is no expressmen's strike on as at present.

Many dealers in all lines are instructing manufacturers to ship goods by express, despite the high cost attending this procedure. They take this step with reluctance, simply because merchandise in all lines is so high now that the retailer has a strong aversion to piling any more margins on top of his costs, but they simply have to do it, they explain, in order to get goods.

All of this may be paving the way for future trans-continental motor truck transportation. The present railroad tie-up is by no means a temporary condition, as retailers realize.

Edward E. Stout, who operates five retail shoe stores in Indianapolis, told the writer that about two years ago, when the situation was about the same as now, he was frequently forced to pay for goods long before they arrived, in order to get the discount. In one instance, where this happened, he sent a check for $187 to cover a small shipment of shoes by freight. The shoes have not arrived yet, and it took the dealer eighteen months to get his money back. The interest on the amount was lost, of course.

The discount question, caused by the tardiness of freight arrivals, is causing a good many disputes between dealers and manufacturers. The latter offer 2 or 5 per centum, as the case may be, for cash within a certain number of days after the goods are shipped. Frequently, the merchandise does not reach the dealer by the day on which he must pay to gain the discount, and he does not know when it will arrive. Retailers argue that adjustments are required to meet the existing situation, but manufacturers are not inclined to extend the discount period just because the railroads are slow.

The motor truck is the answer.

5 Horses' Shoes Outcost Charges for Maintenance of Motor Truck

The following excerpt from a letter written to the Wichita Motors Company by the Penick-Hughes Company, Stamford, Texas, declares that the care of its horses' feet costs more than the entire costs of operating one motor truck which displaced five horses.

"Enclosed I am placing an order with you for another 2-ton Wichita truck, to be used at our Wichita Falls house.

We have been using your Wichita motor truck at Stamford since March 1, 1917. Up to now we have handled this machine, including gasolene, oil, repairs, mud chains, washing (and in fact, every expense that could be connected with the use of a motor truck) at an expense that averages $13.42 per month.

"This machine has taken the place of two very large dray teams that were kept constantly in use, and one extra horse for reserve, making five horses. The shoeing and upkeep of the horses was as much or more than the expense of the motor truck, to say nothing of the feed and the class of horses we had, and the way they were fed was an expense of about $25 per month to the head, making a saving of $125 per month. Besides, this motor truck has saved one hand. However, during the rush seasons we have been forced to use two men on the machine instead of one. It took two men constantly to operate our teams."

Automotive Trailers

Since the issuance of the 1920 edition of the POWER WAGON REFERENCE BOOK there has been some change in the prices of Automotive trailers as given therein. The new prices follow:

Type.	Capacity in Tons.	Price f. o. b. Factory.
4-wheeled, non-reversible	2	$ 997.00
4-wheeled, reversible	2	1,155.00
4-wheeled, non-reversible	3	1,155.00
4-wheeled, non-reversible	5	1,680.00
4-wheeled, reversible	5	1,890.00
4-wheeled, non-reversible	7	1,890.00
4-wheeled, non-reversible	10	2,205.00
4-wheeled, reversible	10	2,625.00
4-wheeled, railroad	7½	1,312.50
4-wheeled, railroad	15	1,837.50
4-wheeled, non-reversible	15	2,587.50
4-wheeled, special	20	3,675.00
Semi-trailer	2	682.50
Semi-trailer	3	840.00
Semi-trailer	5	1,102.50
Semi-trailer	7	1,260.00
Semi-trailer	10	1,575.00
Semi-trailer	15	1,837.50
2-wheeled	1	420.00
2-wheeled	2	577.50
Pole-trailer	2	472.50
Pole-trailer	5	682.50
Pole-trailer	7	840.00
Pole-trailer	10	1,155.00
Pole-trailer	15	1,575.00

Attention is also directed to the fact that the track of the reversible and non-reversible 4-wheeled models of 2 and 3-ton capacity is 56 inches instead of the figure given in the Reference Book. The last model listed therein as a 10-ton pole-trailer should have been listed as a 10-ton 4-wheeled trailer, and the price $2,625 as given above. All prices are f. o. b. the factory of the Automotive Trailer Corp., Kincaid, Ill.

Tucker Heads Olds Sales

Chas A. Tucker has been appointed general sales manager of the Olds Motor Works and will immediately assume the duties of his new position.

For a number of years Mr. Tucker has been president and general manager of the Nebraska Oldsmobile Company of Omaha. His phenomenal success in establishing this business and developing it into one of the most important Oldsmobile distributing points in the United States, bespeaks for him a sales and executive ability that augurs well for his success in his new venture.

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Laws Dead, Passed and Pending

Report of Motor Vehicle Conference Committee on Legislation Affecting Operation of Power Wagons and the Automotive Industry Generally

PART I

THE Motor Vehicle Conference Committee composed of leading members selected from the six nationally organized automotive associations has reported in bulletin form on important motor vehicle bills recently passed by, or now pending in state legislatures. The information which follows has been compiled from the minutes of meetings held by the committee:

Through the week ending with March 20, a total of nearly 800 motor vehicle bills has been introduced in the legislatures of fourteen states which either have held or are holding regular or special sessions this year. These measures have been carefully gone over by the Motor Vehicle Conference Committee and their relation to and probable effect upon the individual members of the component organizations of the committee estimated.

Since there is a very close similarity between the motor vehicle bills pending in the different states, and since these bills group themselves naturally under a few big subjects like Registration Fees, Size and Weight Restrictions, Highways, etc., it will be sufficient to discuss the broad fundamental principles which the Motor Vehicle Conference Committee believes should underlie legislation dealing with these subjects. These discussions follow.

THE committee is particularly anxious to secure from individuals and organizations in the various states coöperation with its work. This coöperation can best express itself by currently keeping the committee posted about motor vehicle legislative matters in their respective states and by joining with the committee in placing before law makers full and correct information upon which they can base motor vehicle laws.

An operator's license in Massachusetts and an annual renewal thereof now costs $1. H. B. 1334 would increase the renewal fee to $2. Maryland H. B. 95 would make the annual fee for an operator's license $5 in that state. Thus it is that a charge which was originally designed to cover the overhead cost of keeping registration records is coming to be used as a revenue getter. The Motor Vehicle Conference Committee is opposed to this new use for operator's license fees, and feels that if a state finds the registration of operators desirable there should be only a nominal charge to cover the cost of original registration and that there should be no subsequent renewals of registration nor renewal fees.

It seems that no state legislature can meet without being called upon to take action on bills which would increase motor vehicle registration fees. This is particularly true in the case of the commercial motor vehicle, which at the very outset of its career as the great modern medium of transportation is being asked in some states to pay annual fees varying from as low as $10 for the lighter duty motor trucks to as high as $1,000 for the heavy duty vehicles. In like manner the passenger vehicle is not overlooked as a revenue producer, and even in New Jersey at the present time a bill is pending which would tax them $1 per horse power per annum. The Motor Vehicle Conference Committee stands squarely behind the schedule of registration fees provided for in the proposed uniform vehicle law, believing them fair to the motor vehicle owner and sufficient to fulfill in any state their logical function of the maintenance of the main improved thoroughfares. On the other hand the committee can see no justification or economic necessity of demanding that motor vehicle fees should pay for highway construction and be made to yield the millions necessary for this purpose.

THE proposed uniform vehicle law provides that there shall not be operated on the highways, without special permit, any vehicle whose width exceeds 96 inches, height 12 feet 6 inches, length 30 feet and gross weight 28,000 pounds, distributed so that there shall not be more than 800 pounds per inch width of tire measured between the flanges. In addition the length of a combination of vehicles is limited to 85 feet. These limitations coupled with speed restrictions, enable the motor vehicle to serve as an efficient and economical medium of transportation without destroying the highways now being built, or rendering them dangerous to the traveling public. The many measures pending in state legislatures which would impose sizes and weights much less than these seem totally to disregard the tendency of present day transportation development in our more progressive states.

Bills requiring motor vehicle owners to take out indemnity bonds as a prerequisite to the registration of their motor vehicles are designed to increase the security of the highways. Such bills, however, if enacted into law would still further heap up the burden of expense to which the motor vehicle operators and owners are now subjected, and it is doubtful whether it would have a tendency to render the highways safer. The great majority of our motor vehicle owners and operators are careful and conservative drivers who do not need a spur of this kind to compel them to operate their vehicles in a proper manner. On the other hand, the careless and reckless driver, with a consciousness that there is someone behind him to pay for the damages that may result from his disregard of life and property, is apt to become more careless and reckless. What is needed to catch this small minority of drivers is good stiff ppnishment. In consequence it seems hardly fair to impose the extra burden of taking out a $5,000 indemnity bond upon the thousands upon thousands of careful drivers who, if they do meet with accidents with rare exception prove not to have been at fault, and therefore not liable for damages.

LAW-MAKERS everywhere are being importuned by the public to find a remedy for the high price of commodities. In consequence all sorts of nostrums are finding their way into bill form and are likely to become law unless sound business judgment prevails in our legislative chambers. The American business spirit cannot thrive in a paternalistic atmosphere; unlimited regulation can never successfully supplant the time-honored principle of supply and demand as a price regulator. As a result the Motor Vehicle Conference Committee is opposed to the placing of more shackles upon the business men of a state by subjecting them to more and more and greater and greater restrictions.

In one class of cases, as in Kentucky H. B. 415, this tax is levied to obtain funds for highway purposes, and is so substantial in size that its imposition is a severe burden to motor vehicle owners who are being called upon to pay higher and higher registration fees for the same purpose. The Motor Vehicle Conference Committee therefore believes that this additional tax on the use of the motor vehicle is undesirable. In the other class of cases, as in Mississippi H. B. 548, the tax is nominal in size, is designed to defray the expense of inspecting gasolene before its delivery to agents, dealers or consumers. The committee, however, does not look with favor upon this proposition on the ground that to be effective it should also include inspection of gasolene as actually dispensed to the public.

In addition to the subjects already discussed in a general way, the following list of pending bills contains matters of utmost importance to the motor vehicle and its use.

Arkansas—Special Session—Adjourned Feb. 6, 1920

Senate Bill 124—Signed by Governor Feb. 20.

Subject to a popular referendum at the General Election this measure provides that: For the privilege of using the public highways in the northern district of Logan County there shall be paid a fee of $7.50 per

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annum on a motor vehicle for family use, and upon all other vehicles a fee, to be fixed by the County Judge of Logan County, but not to exceed $100 per vehicle, according to the use made of such vehicle. These fees are in addition to the state fee of $10 per year per vehicle and in addition to those which may be charged by cities.

Introduced by Rogers, Jan. 29, 1920.
Passed both branches of legislature, Feb. 5, 1920.

[The MVCC believes that the fees provided for in Senate Bill 124 are unfair and uneconomic; that the people of Arkansas would do well to reject the measure at the referendum election; and that the fees as provided for in the Proposed Uniform Vehicle Law should be adopted in lieu of all other fees or taxes, etc.]

Senate Bill 154—Signed by Governor Feb. 26.

Imposes the following annual fees upon vehicles for the privilege of operating on the highways of Johnson County:

Each automobile, auto-truck or auto-trailer	$10.00
Each motorcycle, motor bicycle or motor tricycle	3.00
Each wagon	3.00
Each cart, buggy, hack, delivery wagon, carriage or surrey	2.00
Each log wagon	4.00

These fees are in addition to the State fee of $10 per annum per vehicle and to those which may be charged by cities and, as evidenced by Senate Bill 124, in addition to those contemplated for other counties.

Introduced by Cazort, Jan. 29, 1920.
Passed both branches of legislature, Feb. 5, 1920.

[The MVCC believes that the best interests of all concerned will be served if the governor of Arkansas vetoes this measure, or if it has already become law, if the measure is repealed at the next session of the legislature, and the fees of the Proposed Uniform Vehicle Law adopted exclusively for the state.]

Kansas—Special Session—Adjourned Jan. 28, 1920

House Bill 36

Makes theft of motor vehicles grand larceny.

Passed both branches of legislature.
Signed by Governor, Jan. 27, 1920.

House Concurrent Resolution 4.

Requests the United States Congress to pass the bill now pending before it to make appropriations for the further co-operation of Federal government with the several states in the construction of highways.

Passed House, Jan. 9, 1920.
Passed Senate, Jan. 23, 1920.

Kentucky—Adjourned March 17, 1920.

House Bill 46; Senate Bill 99—Killed Feb. 2.

Provides for registration of motor vehicles with county clerks; fixes registration fees to be paid into county treasuries; prescribes use of fees on county highways. Following is the schedule of fees provided for in the measures:

A registration fee of $6 on each motor vehicle of less than 25 H.P.; $11 on each motor vehicle of 25 to 50 H.P.; $20 on each motor vehicle of 50 H.P. or over.

On motor trucks the following rate shall be charged: Those having a capacity of:

More than 1,000 pounds and up to 2,000 pounds	$15.00
More than 2,000 pounds and up to 3,000 pounds	20.00
More than 3,000 pounds and up to 4,000 pounds	25.00
More than 4,000 pounds and up to 5,000 pounds	30.00
More than 5,000 pounds and up to 6,000 pounds	35.00
More than 6,000 pounds and up to 7,000 pounds	45.00
More than 7,000 pounds and up to 8,000 pounds	55.00
More than 8,000 pounds and up to 9,000 pounds	65.00
More than 9,000 pounds and up to 10,000 pounds	75.00

More than 10,000, $75 plus $50 for each additional ton.

For motorcycles the fee shall be $5.

House Bill 46, introduced by Wheeler, Jan. 12, 1920.
Referred to Public Roads and Highways Committee and placed on General Calendar, Jan. 30, 1920.
Senate Bill 99, introduced by Demumbrun, Jan. 20, 1920.
Referred to Revenue and Taxation Committee and placed on General Calendar, Feb. 2, 1920.

[The MVCC is opposed to the enactment into law of this measure, first because it feels that the registration of motor vehicles can be handled under the central control of the state far more effectively and satisfactorily than under the counties; second because the registration fees provided for do not conform with those recommended in the Proposed Uniform Vehicle Law and third because it believes that the motor vehicle fees should be used first for the maintenance of main arteries of travel or State Highways and after that extensions of, additions to, or immediate connections with these State Highways.]

House Bill 60; Senate Bill 12—Passed Senate; House concurred Nov. 1.

Creates a Department of State Roads and Highways and lays down a primary system of State Highways in which fifty-five highway projects, or routes, for highways are prescribed.

House Bill 60, introduced by Smith, Jan. 14, 1920.
Referred to Committee on Public Roads and Highways and given second reading in House, Feb. 6, 1920.
Senate Bill 12, introduced by Moss, Jan. 15, 1920.
Referred to Public Ways and Internal Improvements Committee and given second reading in Senate, Feb. 6, 1920.

[The MVCC while favoring the general provisions of this bill believes that it would be far wiser and more economical to give the highway department power to prescribe the routes for State Highways after giving full consideration to the highway transportation needs of the state than to permit the legislators to make the choice with a view oftentimes solely to getting the most for the counties which they represent.]

House Bill 98; Senate Bill 39.

Requires rear-view mirrors on motor trucks. Passed.

House Bill 98, given second reading in House, Feb. 16, 1920.
Senate Bill 39, passed Senate, Feb. 16, 1920.

House Bill 323.

Provides for the registration of motor vehicles with the State Tax Commissioner; fixes the registration fees thereof; prescribes equipment and use thereof; limits weights and regulates traffic. The fees for registration are as follows:

For passenger automobiles defined as those "designed for carrying passengers and having provisions for not more than seven passengers including operator":

$ 6.00 for each automobile of less than 25 H.P.
11.00 for each automobile of 25 to 50 H.P.
20.00 for each automobile of 50 H.P. or over.

The fees for trucks defined as automobiles other than passenger automobiles are:

1,000 pounds or less	$11.00
1,000 pounds to 2,000 pounds	15.00
2,000 pounds to 3,000 pounds	20.00
3,000 pounds to 4,000 pounds	25.00
4,000 pounds to 5,000 pounds	30.00
5,000 pounds to 6,000 pounds	35.00
6,000 pounds to 7,000 pounds	45.00
7,000 pounds to 8,000 pounds	55.00
8,000 pounds to 9,000 pounds	65.00
9,000 pounds to 10,000 pounds	75.00

Over 10,000 pounds $75 plus $50 for each additional ton.

Trucks used to transport persons or property, for hire between municipalities, 50 per centum more than above fees for each truck.

Dealers must pay $25 for the first set of plates and $1 per set for extra plates for exclusive use on vehicles used for exhibition or demonstration purposes.

Other provisions of this bill authorize reciprocal relations with other states; require on automobiles two lamps whose lights will reveal objects at 200 feet, etc. and forbids sale of an automobile whose lights will not comply with the lighting provisions; limits the number of trailers to two (2); allows a maximum gross weight of 15 tons and prescribes numerous rules to be followed in the operation of vehicles.

Introduced by Roth, Jan. 30, 1920.
Referred to Revenue and Taxation Committee.

[The MVCC expresses itself in general opposition to this bill so far as its provisions are at variance with those portions of the Proposed Uniform Vehicle Law which it has gone on record as favoring In particular it believes that the fees should be modified to conform with those set forth in the Uniform Law.]

Senate Bill 265.

Provides for annual registration fee of $1 per H.P. on each motor vehicle; on commercial trucks the fees listed below are to be charged on capacity as stated in application for registration, and from the language of the bill the inference is that these fees are to be in addition to the H.P. fee.

1,000 or less pounds capacity	$ 22.00
1,000 to 2,000 pounds capacity	30.00
2,000 to 3,000 pounds capacity	40.00
3,000 to 4,000 pounds capacity	50.00
4,000 to 5,000 pounds capacity	60.00
5,000 to 6,000 pounds capacity	70.00
6,000 to 7,000 pounds capacity	90.00
7,000 to 8,000 pounds capacity	110.00
8,000 to 9,000 pounds capacity	130.00
9,000 to 10,000 pounds capacity	150.00
Over 10,000 pounds capacity, $150 plus $50 for each additional ton.	
Motorcycle	10.00

Introduced by Moss, Feb. 10, 1920.
Reported favorably by Mines and Mining Committee and given second reading in Senate, Feb. 17, 1920.

[The MVCC is opposed to the passage of this measure which imposes registration fees double those now obtaining in the state. It advocates the adoption, on the other hand, of the fees recommended in the Proposed Uniform Vehicle Law.]

H. B. 415—Tax on Gasolene.

Imposes a tax of 2 cents on each gallon of gasolene or any substitute therefor, sold at retail; the taxes to be used in the con-

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struction and maintenance of state highways.

By Smith.
Passed House, Mar. 2, 1920; Senate, Mar. 10, 1920.

H. B. 466—License Taxes on Business.

Imposes a license tax upon various businesses in Kentucky, among them the following:

Gasolene filling station, $100 per annum upon each tank or pump from which gasolene is drawn.
Garages, $15 per annum.
Garages and filling station combined, $20 per annum, which shall cover one gasolene tank or pump. $5 extra for each resident agent for each make of machine which he represents.
By Huntsman.
Passed House, Mar. 9, 1920; Senate, Mar. 16, 1920.

Maryland—Now in Regular Session

House Bill 29.

[The MVCC approves this measure which repeals and re-enacts the "Sabbath Breaking" laws of the state so that among other things gasolene may be sold on Sunday.]

Introduced by Iverson, Jan. 26, 1920, and given first reading in House on the same date.

House Bill 95.

Requires owner of motor vehicle to secure annually from Maryland Commissioner of Motor Vehicles at a fee of $5 an "ownership card," which he must carry when operating his vehicle in the state.

Introduced by Holzknecht, Feb. 3, 1920, and referred to Ways and Means Committee.

[The MVCC is unreservedly opposed to the passage of this bill.]

Senate Bill 1.

Authorizes and directs State Road Commission to prepare plans for the future development of State and County Highways.

Introduced by Metzrott, Jan. 7, 1920, and referred to Roads and Highways Committee.

[The MVCC heartily favor the passage of this bill because it aims to substitute for the present haphazard methods of selecting highway routes for improvement a scientific and far-sighted method based upon the vital highway transportation needs of the state.]

Senate Bill 45.

Provides special and additional tax on motor vehicles with speed capacity of more than 40 miles per hour.

After January 1, 1921	$ 50.00
After January 1, 1922	100.00
After January 1, 1923	150.00
After January 1, 1924	200.00
After January 1, 1925	250.00
After January 1, 1926	300.00
After January 1, 1927	350.00
After January 1, 1928	400.00
After January 1, 1929	450.00
After January 1, 1930	500.00
Annually thereafter	500.00

Introduced by Metzerott, Jan. 27, 1920.
Killed in Senate, Feb. 12, 1920.

H. B. 87—Price Fixing; State Regulating License on Business.

Amends Article No. 56 of Bagby's Annotated Code of Public Civil Laws of Maryland title "Licenses" by adding six new and additional sections as follows:

"Section 188A. Requires everyone desiring to sell merchandise in Maryland to file with the Clerk of the Court of Common Pleas of Baltimore City or with the Clerk of the Circuit Court of a county an application setting forth that he is not a member of any price-fixing association nor a party to any agreement to fix prices.

"Section 188B. Provides for issuance to applicant of so-called 'State Regulating License" to cost in the case of twenty-six businesses including the following:

"Manufacturers of State of Maryland selling to merchants and consumers within this state, $10.25.

"Commission merchants, $10.25.

"Refiners and wholesale dealers in oil and gasolene, $50.25.

"Retail dealers in groceries and merchandise, including traders, $2.25.

"Section 188C. Requires twenty-five cents (25c) of each fee to go to clerks and balance to State Treasurer for general use.

"Section 188D. Forbids any one to do business without obtaining license and paying fee.

"Section 188E. Fixes fine for failure to obtain license.

"Section 188F. Forbids any one to enter into price-fixing associations or agreement."

By Holzknecht.
In Ways and Means Committee.

H. B. 239—Motor Vehicle Licenses.

Amends Section 141 of Motor Vehicle Law by adding two new weight groups to class B and imposing registration fees as follows: "For each motor vehicle equipped with solid tires and having a rated carrying capacity of not more than 1½ tons, $30; of not more than 2½ tons, $50."

By Roberts.
In Ways and Means Committee.

H. B. 337—Security for Damages Caused by Motor Vehicle.

Provides that after June 1, 1920, no motor vehicle shall be registered unless the owner thereof furnishes to the Commissioner of Motor Vehicles security for the payment of damages to any person entitled thereto on account of injury to persons or property occasioned by the operation of such motor vehicle. The amount of the security is fixed at $1,000 for damage to property and at $5,000 to $10,000 for injury to persons.

By Jones.
In Judiciary Committee.

S. B. 111—Motor Truck Lines.

Provides for the appointment by the Governor of a so-called Director of Farm Products who among other things designed to promote the efficient and economical disposition of farm products is authorized to maintain and operate in his discretion motor truck lines along the state highways to and from markets.

By Norris.
In Finance Committee.

S. B. 142—Workmen's Compensation for Garage Workmen.

Enlarges the application of the law to cover among numerous other workmen those employed in "public garages." Increases rates of compensation and length of time that compensation shall run.

By Eppler.
In Judicial Procedure Committee.

Massachusetts—Now in Regular Session

House Bill 106.

Limits width of vehicle with load to 96 inches; height to 11 feet; length to 28 feet, and length of combination of vehicles to 65 feet.

Advocated by Massachusetts Highway Commission; introduced Jan. 9, 1920, and referred to Roads and Bridges Committee, which will give hearing on the measure Feb. 19, 1920.

[The MVCC feels that these restrictions are too severe and advocates the limits fixed in the Proposed Uniform Vehicle Law.]

House Bill 565.

Lays down certain factors which the State Highway Authorities must recognize in selecting direct routes for highway improvement.

Introduced Jan. 19, 1920, and referred to Roads and Bridges Committee.

[The MVCC believes that a measure of this sort which aims to establish sound basis for the correct selection of highway routes on which great sums of money are to be spent, should be strongly supported and its enactment into law assisted.]

House Bill 784.

Provides for recording violations of motor vehicle laws on license card of operator.

Introduced by Bowser, Jan. 20, 1920, and referred to Judiciary Committee.

[The Motor Vehicle Conference Committee went on record as opposed to this measure.]

Senate Bill 112.

Authorizes Public Works Department to keep main highway arteries passable during winter.

Introduced by Chamberlain, Jan. 16, 1920, and referred to Roads and Bridges Committee.

[The MVCC felt that every possible effort should be made to have this meritorious measure enacted into law.]

Senate Bill 233.

Reported unfavorably.

Provides for an investigation of, and report on, the comparative cost and efficiency of transportation of persons and goods by electric railways and motor vehicles.

Introduced by Pearson, Jan. 22, 1920, and referred to Committee on Street Railways, which gave hearing on Feb. 10, 1920, and will give another hearing Feb. 26, 1920.

Senate Bill 248.

Provides for instruction of public school children in avoidance of street accidents.

Introduced by Walsh, Jan. 23, 1920, and referred to Committee on Education, which will give hearing on Feb. 24, 1920.

[The MVCC regards this as a decided step in the right direction and feels that enormous good would follow the enactment of this measure by the Massachusetts Legislature and of similar measures by the other states.]

H. B. 545—Gasoline Sales Tax.

Levies annual privilege tax on each person, firm, corporation or agency selling gasolene in quantities of 25 gallons or more. The tax is fixed at ½ of 1% of the gross sales for the preceding year; it is to be paid to the State Treasurer and used for the general purposes of the State Government.

By Mitchell.
Reported favorably Mar. 20.

H. B. 548—Gasolene Filling Station Tax.

Levies an annual privilege tax on each person, firm, corporation or agency operating a gasolene or other motor powered filling station.

In a municipality of more than 10,000 inhabitants	$100
In a municipality of 5,001 to 9,999 inhabitants	50
In a municipality of 5,000 or less inhabitants	25
In each county outside the limits of a municipality	10

This tax is to be collected by the County Sheriffs, paid into the Country Treasury and used for maintenance of highways.

By Mitchell.
Reported favorably Mar. 20.

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H. B. 596; S. B. 408—Standards for Heating and Power Fluids.

Provides for the establishment of qualitative standards for gasolene, naphtha, benzine and other liquids and fluids used for heating and power purposes and for the inspection thereof. To defray expenses of Act a charge of ¼ of 1 cent per gallon is levied on these liquids and fluids "before their delivery to agents, dealers or consumers of this State."

House Bill 596, by Mitchell.
Passed House, Feb. 23, 1920.
In Senate Ways and Means Committee.
Senate Bill 408, by Middleton.
Reported favorably, Mar. 4, 1920.

H. B. 597; S. B. 409—Standards for Illuminating Fluids.

Provides for the establishment of qualitative standards for kerosene or other illuminating oils and for the inspection thereof. To defray expenses of Act ½ of 1 cent per gallon is levied on such oils "before their delivery to agents, dealers or consumers in this state."

By Mitchell, House Bill 597.
In Judiciary Committee.
Senate Bill 409, by Middleton.
Reported favorably, Mar. 4, 1920.

H. B. 718—Operators' Licenses.

Provides for examination by State Highway Commission of applicants for driver's license; fixes original fee for same at $1 and cost of annual renewal at 50 cents. Drivers must be 16 years of age or more.

By Walker.
In Ways and Means Committee.

H. B. 780—Publicity of Wholesale Prices of Commodities.

Requires every resident or non-resident wholesale dealer selling goods in Mississippi or every wholesale or retail dealer located in Mississippi and buying goods from such resident or non-resident wholesale dealers to file with the Commissioner of Agriculture a statement showing the actual price at which goods are sold or offered for sale to resident wholesalers or retailers. The Act is designed to prevent profiteering.

By Stochett.
Reported unfavorably, Mar. 10, 1920.

H. B. 811—Minimum Age Limit for Operators.

Prohibits persons under fifteen years of age from driving any automobile or truck.

By Pate.
Reported favorably in House, Mar. 10, 1920.

H. B. 825—Cost Price on Goods.

Forbids sale or delivery of commodities in Mississippi unless such commodities are plainly marked so as to show cost price thereof.

By Watts.
Reported unfavorably, Mar. 10, 1920.

S. B. 248—Taxes on Motor Vehicles, Gasolene, Etc., for Highways.

Requires the privilege tax imposed on motor vehicles to be used for the construction of highways and bridges; imposes a privilege license of 1 cent per gallon on the sellers of gasolene to consumers, the same to go to a State Highway Fund; levies an ad valorem State tax of 1 mill on the $1, which is also to go to the State Highway Fund, and requires owners of wagons, surries, buggies, road-carts, etc., to pay an annual privilege tax for running same on the highways. The measure also provides for the distribution of this Highway Fund among the counties in proportion to their land areas.

By Ball.
In Roads, Ferries and Bridges Committee.

S. B. 378—$25,000,000 Bond Issue for Highways.

A copy of this bill has not been received, so that it is impossible at this time to say in what manner the bonds are to be carried and retired.

By Roberts.
Reported favorably, Mar. 2, 1920.

S. B. 383—$10,000,000 Bond Issue for Highways.

Provides that one-half of all motor vehicle taxes and taxes on sale of gasolene which may now or hereafter be imposed shall be used to set up a sinking fund for the purpose of paying the interest and principal of these bonds. The other one-half is to be paid to the County Treasuries and used in constructing and maintaining state highways.

By Roberts.
Passed Senate, Mar. 2, 1920.
In House Roads, Ferries and Bridges Committee.

H. B. 660—Compulsory Liability Insurance.

Prohibits registration of a motor vehicle unless the owner thereof takes out general liability insurance of not less than $5,000 to cover possible injury to persons or property caused by such motor vehicle.

By Look.
Killed in House, Mar. 11, 1920.

H. B. 1189—Marking of Horse-Drawn Vehicles.

Requires horse-drawn vehicles except those used for pleasure to be plainly and conspicuously marked with the name and address of owner and license number, if any.

By Early.
In Roads and Bridges Committee.

H. B. 1280—Size Restrictions on Motor Vehicles.

Prohibits operation on highways without special permit of commercial motor vehicles, motor trucks or motor-drawn vehicles whose outside width exceeds 96 inches, or whose extreme over-all lengths exceeds 28 feet, provided that a combination of vehicles or trailers may exceed 28 feet but not 65 feet in length.

By Young.
In Roads and Bridges Committee.

H. B. 1333—Registration Fees.

Increases annual registration for motorcycles from $2 to $5 and requires all automobiles of less than 30 h.p. to pay an annual registration fee of $10. At present time automobiles of less than 20 h.p. pay only $5.

By Layman.
Passed House, Mar. 11, 1920.

H. B. 1334—Operators' Licenses.

Increases annual renewal fee for motor vehicle operator's license from $1 to $2.

By Layman.
Passed House, Mar. 9, 1920.

S. B. 313—Registrations by Manufacturers, Dealers or Repairers.

Permits a manufacturer of or dealer in motor vehicle bodies or tops or a person engaged in the business of repairing motor vehicles to apply for and obtain in the same manner as a dealer the registration of a motor vehicle under his control but not owned by him. Provides fee $10 for first registration and one pair of number plates and $10 for each additional registration.

By Knox.
Passed Senate, Mar. 16, 1920.

MISSISSIPPI

H. B. 277—Caterpillar Trucks; Wheels With Lugs.

Makes it unlawful to operate on the highways a caterpillar truck or a truck or other vehicle with lugs on its wheels.

By Collins.
Passed House, Feb. 6, 1920.
Reported favorably in Senate, Mar. 4, 1920.

Mississippi—Now in Regular Session

House Bill 7; Senate Bill 131.

Authorizes a $25,000,000 bond issue for a State Highway System the debt to be carried and paid off (1) by the "Motor Vehicle Road Fund" derived from motor vehicle license fees, etc., (2) by an ad valorem tax to take care of any balance annually uncovered by the Motor Vehicle Road Fund.

House bill 7, introduced by Pate, Jan. 22, 1920.
Killed in House, Feb. 11, 1920.
Senate Bill 131, introduced by Middleton, Jan. 26, 1920, and referred to Committee on Roads and Bridges.

[The MVCC believes that motor vehicle license fees and penalties should be used first for the maintenance of main highway arteries and if this function does not use up all the available money the balance should be used, second, for the improvement and maintenance of, extentions of, additions to, and immediate connections with these main arteries of travel. In consequence it is strongly opposed to the highway financing method of House Bill 7 and of Senate Bill 131.]

House Bill 8; Senate Bill 130.

Increases tax on motor vehicles for privilege of using highways. The schedule of fees follows:

Each motor vehicle propelled by electricity $15.00

Each commercial motor vehicle with carrying capacity of:

1 ton or less	$ 18.00
1½ ton	30.00
2 ton	48.00
2½ ton	60.00
3 ton	84.00
3½ ton	106.00
4 ton	144.00
4½ ton	192.00
5 ton	240.00
6 ton	300.00
Each motorcycle	12.00

On each motor vehicle 72 cents per H.P. with a maximum fee of $5. From the language of the bill this H.P. fee seems to be in addition to the other fees enumerated for motor vehicles.

House Bill 8, introduced by Pate, Jan. 12, 1920.
Referred to Committee on Roads, Bridges and Ferries.
Reported favorably but recommitteed Feb. 13, 1920.
Senate Bill 130, introduced by Middleton, Jan. 26, 1920.
Referred to Committee on Roads, Bridges and Ferries.

[The MVCC regards the fees prescribed in this bill as unfair, based as they are upon the principle of a "privilege" tax, and that their size is unsound economically. It believes that these fees should be reduced to conform with those recommended in the Proposed Uniform Vehicle Law.]

House Bill 60—Reported unfavorably.

Imposes a privilege tax on gasolene dealers, the proceeds thereof to go to the Motor Vehicle Road Fund. The schedule of fees is:

	Per annum.
Sale of less than 1,000 gallons per annum	$10.00
Sale of 1,000 to 2,000 gallons per annum	20.00

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Sale of 2,000 to 3,000 gallons per annum 60.00
Sale of more than 3,000 gallons per annum 60.00
Plus $10 for every 1,000 gallons over 3,000.
Introduced by Mitchell, Jan. 13, 1920, and referred to Committee on Roads, Ferries and Bridges.

[The MVCC feels that this bill also is entirely wrong, it being based on the "privilege" principle and that its passage should be opposed.]

House Bill 429—Reported unfavorably.

Levies a so-called special privilege license tax of $50 per annum on dealers in "automobiles, automobile parts, automobile supplies and accessories, gasolene, oils for automobiles, motor trucks and tractors, or supplies thereof, or any materials necessary to, or to be supplied to, or used in or on any automobile vehicle."

Introduced by Pate, Feb. 7, 1920, and referred to Committee on Ways and Means.

[The bill is opposed by the MVCC.]

Senate Bill 14—Reported Favorably.

Creates a State Highway Department; establishes a State Highway System; levies annual privilege taxes on motor vehicles for establishing a State Highway Fund and provides for a $3,000,000 bond issue for highways. Following is the schedule of fees provided:

Motor trucks, freight or passenger, 50c per rated H.P. plus $5 per ton for each ton carrying capacity (factory rating).
Automobiles, motorcycles or other vehicles of like character, 50c per rated H.P.
"Taxis," $1 per rated H.P.
Electric automobiles or trucks, $20 each and $5 additional per ton carrying capacity (factory rating) on electric trucks.
Dealers, $25 per annum for a demonstration license and a suitable number and $5 per annum for each additional number.
Introduced by Cullum, Jan. 12, 1920, and referred to Roads, Ferries and Bridges Committee.

[The MVCC, while finding little fault with the fees provided for in this bill are not unqualified in their approval of some of its other features. In consequence it is non-committal in its attitude.]

Senate Bill 145—Postponed indefinitely.

Authorizes $25,000,000 bond issue for a State Highway System and requires 50 per centum of the Motor Vehicle Fund to be used to establish a sinking fund for the purpose of paying the interest and principal of these bonds, the remaining 50 per centum to be paid to the counties for use only on State Highways within such counties.

Introduced by Roberts.
Passed Senate, Feb. 13, 1920. Motion to reconsider tabled.

[The MVCC, while heartily favoring the establishment of a State Highway System in Mississippi, believes that the ultimate welfare of such a system depends upon the preservation intact of the Motor Vehicle Fund, first for maintenance of State Highways and second, when this is taken care of, for the enlargement and expansion of such a system. Furthermore, it is not in favor of scattering the fund among the counties for disposition, but believes that complete control over the money should be vested in the central authority of the state.]

(To Be Continued.)

Blames British Makers for American Invasion

ADVISES ENGLISH TO TREBLE OUTPUT

"The message which has been addressed to Europe by the Secretary of the United States Treasury will not, we hope, be lost upon the British motor industry in general and the manufacturing side of it in particulr," comments the editor of a British motor truck journal. "He tells us in effect —and the standing of the pound sterling in New York appears to support his statements—that our credit is not as good as it was, and that it is high time we did something to meet our day-to-day liabilities. However unpleasant a reminder of our changed fortunes the message may be, it may, nevertheless, prove a useful and wholesome stimulant to our industrial activities. Our obvious course—indeed, we do not appear to be given any other—is to import less from the United States and to export more either to that country or to some others where such commodities as we can produce are in demand.

"To get down to what our own industry is most concerned with we must import fewer motor cars from America and make more not for ourselves only but for those colonial and overseas markets which are in danger of being lost entirely to the very people who—after they have got our gold and our securities—are beginning to doubt our solvency as a nation. It is not as if we were getting good value by the purchase of American cars; clearly we are not with the rate of exchange so adverse to us. On the other hand, the situation is such as should delight the heart of the British car manufacturers. They have every inducement even to treble their output.

"Lest our remarks should be taken as reflecting upon those motor traders who are interested in the distribution of American cars, let us say at once that we consider the prime responsibility for the presence of United States vehicles upon our home market at the present juncture rests largely, if not entirely, upon our own manufacturing shortage."

Hebb Changes Name to Patriot and Raises Capital Stock to $10,000,000

The Patriot Motors Company of Lincoln, Nebraska, with a capitalization of $10,000,000, has been incorporated. The new firm springs out of the old Hebb Motors Company, which had a capitalization of only $2,500,000. The increase in capital stock and change in name means a big expansion program, involving three or more new buildings on the company's seventeen and a half acres in Havelock, and branching out in the production of passenger cars. The company, it is claimed, will furnish employment to between 2,000 and 3,000 people before the close of this year.

The incorporators of the new concern are A. G. Hebb, E. C. Hammond, L. A. Winship, K. W. Gillispie and A. H. Armstrong, who were the officers and directors of the Hebb Motors Company. With the formation of the new corporation, Lincoln will have one of the largest exclusive motor truck manufacturing establishments in the United States.

The corporation claims to have $8,000,000 worth of orders on the books at the present time and under the new arrangement it is planned to do at least $16,000,000 worth of motor truck business this year. The company now has contracts covering the sale of motor trucks in every state west of the Mississippi and in all the southeastern states. During the coming year it is planned to invade and develop the eastern and north-eastern states. The company has representatives in Canada, Mexico and in almost every country of South America. It also is doing business in England and the distributor of one of the largest lorry companies of England is expected shortly in Lincoln.

It is contemplated to build an office building, two stories in height, within the next 12 months. The building will contain a gymnasium, kitchen and dining room for employees and other conveniences. Under the present plans, the first building to be completed will be a woodworking plant, 100 by 400 feet. New machinery will be installed. All the wood that goes into a car or motor truck, will be cut in this shop. One hundred and fifty men will be employed in this plant alone at the start. This will be the first of a unit of several buildings of like size. A foundry and machine shop will then be erected and a body factory probably will be the next structure to go up. At the present only 12 motor trucks a day are being put out, but by mid-summer the production is expected to reach the capacity of 25 a day. The company now employs something over 500 people.

Grants Saving to Trucks

The annual report of Walker D. Hines, director general of railroads for the year 1919, makes the following statement with reference to the operation of the Cincinnati terminal system.

"The motor terminal system at Cincinnati providing for the handling of freight between the various terminals by motor trucks with removable bodies which can be placed in the freight terminals for loading direct from the cars picked up by the motor trucks when the loading is completed, was inaugurated May 10, 1919, and is working satisfactorily. Some of the advantages are quick dispatch of freight; saving of two handlings; 50 per centum decrease in damage to freight in loading and unloading, and decrease of about 15 per centum per ton in cost of handling. The old method was by horse-drawn wagons.

"A change in method of interchange between north bound and southern lines at Cincinnati has resulted in speeding up the movement of loads through the terminal, and where transfers formerly often consumed as much as 12, 14 and in some cases 16, hours on one trip, they are now as a rule making two round trips in 8 to 10 hours. The saving in money is estimated at several hundred thousand dollars per year."

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Hilo Elevating and Tipping Body Follows New Lines in Designing

A new type of elevating and dumping motor vehicle designed on entirely new principles and adapted for handling all classes of loose material is to be found in the Hilo body manufactured by the Lee Loader & Body Company, Chicago.

The body is fitted with tail gate, a small door in the tail gate, and side chutes, so that in narrow streets or alleys the body may be raised and material shot across sidewalks or lawns or into high alley windows, etc. Lime may be dumped into the contractor's lime boxes; stone and sand may be dumped into bins, etc. Ordinary dump bodies do not pile material more than a couple of feet high—not even as high as the chassis frame, whereas this device will pile material six or seven feet, for economy of yard space. The Hilo is simply another labor saving device to aid in the rapid movement of material and insure more pay loads per day.

The body is raised by a hydraulic hoist connected to the motor in the usual method. A special hoist was made, larger than heretofore, with heavy cross arms and a double set of cables. It is claimed that the motor truck will elevate to its full height in 45 seconds. In operation, the body first rises to a level position, and may be held there by stopping the pump, or if it is desired to tip the body, it is simply necessary to operate the hoist to its full height. The load may be elevated straight in the air to a level position about 7 feet 9 inches from the ground to the floor of the motor truck, or it may be raised to its highest dumping position when the front end of the floor is 11½ feet above the ground and the tail gate about 7½ feet. A third position which the machine assumes is making an ordinary low dump over the rear end of the chassis, similar to the ordinary dumping trucks, and by a simple mechanism the motor truck may be made to dump at any elevation between the height of the frame and 7½ feet.

The low dump is accomplished by unlocking the front end of a center beam; the body then rotates over the rear end of the chassis as in the ordinary dumping truck. In this case the elevating lever mechanism is entirely out of action. The levers which control the elevating and dumping of the body are made of standard 6-inch I-beams, reinforcing their central portions by channels which are riveted inside of the flanges of the I-beam. There are two levers made of pairs of these beams, each hinged to either end of the body. The lower end of these levers carries rollers which roll along on the chassis frame when the body is raised to a high tipping position.

A roller carriage at the intersection of the two main levers controls the height to which the rear end of the floor may be raised. This carriage is carried by the rear main lever and by a simple mechanism may be moved backward so as to change the intersecting point of these two levers. The location of this carriage is set by a screw operated by hand for any desired height. In order to prevent the body from rocking sideways, a pair of stabilizer arms are attached to the rear end of the chassis and the body. This stabilizer comprises a transverse shaft carried by the body and a second transverse shaft carried by the chassis, each having two arms keyed solidly to their respective shafts. This mechanism prevents the rolling of the body in any of its elevated positions. This device has nothing to do, however, with lifting the load. This body is designed for 4, 5 and 6-ton motor trucks.

Trucks Keep Open Roads

Severe weather in various sections of the country throughout the winter has been choking the highways with snow. To put these roads of communication in condition for the traffic so essential to business of this country, motor trucks were called upon because speed was essential. The increasing use of the motor truck for this purpose has come about through the pressing need for clear thoroughfares. In almost every large city of the country fleets were in use throughout the winter.

Intercity transportation has assumed such importance that many of these companies ran their own plows to keep the roads used between cities opened. The importance of this rapidly developing new line of work for the motor truck may be gleaned from the fact that a recent snow storm in New York City required the service of 14,000 men working for a week to clear the snow away.

U. S. Consul Says Canary Islands Want Trucks in Place of Mules

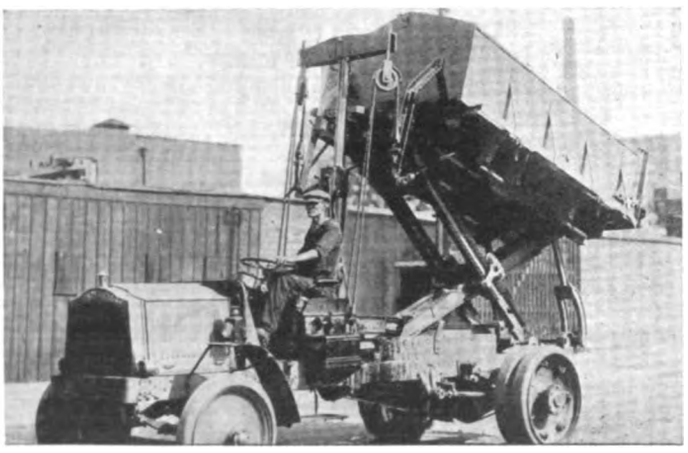
There are about 875 motor vehicles registered in the Canary Islands, of which 400 are in Teneriffe and 432 in Grand Canary. Only about half a dozen of these are motor trucks. Without a mile of steam railway in the islands, the use of automobiles for passenger and mail service is widely extended.

Millions of pounds of fruit and vegetables are now hauled every year from the plantations to the ports by 6-mule teams in a slow and expensive manner. This labor could be economically performed by motor trucks. The managers of the big fruit combines had before the war contemplated the gradual replacement of the mule teams by motor trucks specially constructed to carry loads very light in proportion to the bulk involved. The war put an end to these plans temporarily. Most of the managers of the larger fruit plantations are Englishmen, and as yet no American firm has seriously attempted to enter the market with a motor truck adapted to the local needs.

Conversations with men responsible for the actual management of the fruit and vegetable exporting firms reveals the fact that they are eager to see the motor truck proposition tried out. If after a careful study an American firm will place one or two motor trucks here, with bodies specially built to suit local needs, the successful demonstration of the economy and practicability of these machines will result in a steady increase in sales until the mule-team system disappears. There are only a few districts where bad roads exist or excessive grades are to be encountered.

Fan Company Reorganizes

The American Aero Company, Chicago, manufacturers of the Juelson two-bladed fan for automobiles, has just been reorganized. The new officers and directors are as follows: President and Treasurer, F. H. Wellington, South Bend; vice president, Col. George M. Studebaker, South Bend; secretary, Paul V. Harper, Chicago; board of directors, F. H. Wellington, Col. George M. Studebaker, Clement Studebaker, Jr., Edward S. Hyman, and Edwin Juelson. The administrative offices of the company are now located at South Bend.



Hilo body in elevated position.

Same body ready for loading.

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1. *Two-ton Garford owned by Cincinnati Moving Company of Cincinnati, Ohio, has run 14,000 miles on "NOBBIES."*
2. *White, 1½-ton truck owned by Summerfield Company has averaged better than 15,000 miles on "NOBBIES" in and about Boston, Mass.*

NOTHING has done more to increase the popularity of 'NOBBY CORDS' than the downright effectiveness of general hauling.

The moving van industry—sold forever on 'NOBBY CORD' cushioning power, plus economy, have forwarded these compliments—"The Cincinnati Moving Company's two-ton Garford is riding on the original air of a year ago. These tires have no less than 14,000 miles to their credit and have reduced our upkeep 30%.

Quoting the Summerfield Company—" 'NOBBIES' on our 1½ ton White have given us better than 15 000 miles and never off the rim; we recommend 'NOBBIES' to our friends."

If your trade is looking for real economy in hauling, inform them that—

"Nobby Cords" Save in Every Phase of Truck Operation

Please mention "Power Wagon" when writing to advertisers.

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THIS COMPANY PROPOSES SOON TO UNDERTAKE THE PRODUCTION OF PASSENGER CAR AND MOTOR TRUCK AXLES WHICH, FOR THEIR HIGH MERIT, WILL SATISFY THE EXACTIONS OF THE MOST DISCRIMINATING MANUFACTURERS IN THE AUTOMOTIVE INDUSTRY.

THE EATON AXLE COMPANY, CLEVELAND, OHIO
DIVISION OF THE STANDARD PARTS COMPANY

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AXLES

ADEQUATE FINANCIAL RESOURCES, EXTREMELY MODERN EQUIPMENT AND THE MUSTERING OF A TECHNICAL PERSONNEL DISTINGUISHED FOR PREVIOUS ACTIVITIES IN SIMILAR ENDEAVOR, PERSUADE US THAT OUR EXPECTATIONS ARE NOT UNREASONABLE.

THE EATON AXLE COMPANY, CLEVELAND, OHIO
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AXLES

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Ace

Ace Motor Trucks are completely equipped. We make all Ace cabs. Our woodworking plant is probably the largest in the Truck Industry.

The Best Truck Show is on the Road

It's only a few months since the first advertisement on Ace Trucks was printed.

A new company—a new truck—at a time when the Motor Truck business was hesitating.

Yet an immediate response to the ideas embodied in Ace Trucks—an immediate acceptance of those ideas—a complete sympathy for the unusual product and the unusual Sales Plan on which the product was to be marketed.

Ace Trucks on Exhibit Every Day in the Year—Today Ace Motor Trucks are on the road working, paying, earning their price back plus dividends.

Today we have blanket orders from Distributors and Dealers, asking us to ship any size in any quantity we can deliver.

Today we have more applications for representation than we can cover for some time.

Ace Trucks have arrived, quicker and more definitely than any other truck in the field.

Ace

The AMERICAN MOTOR TRUCK COMPANY
NEWARK OHIO.

Please mention "Power Wagon" when writing to advertisers.

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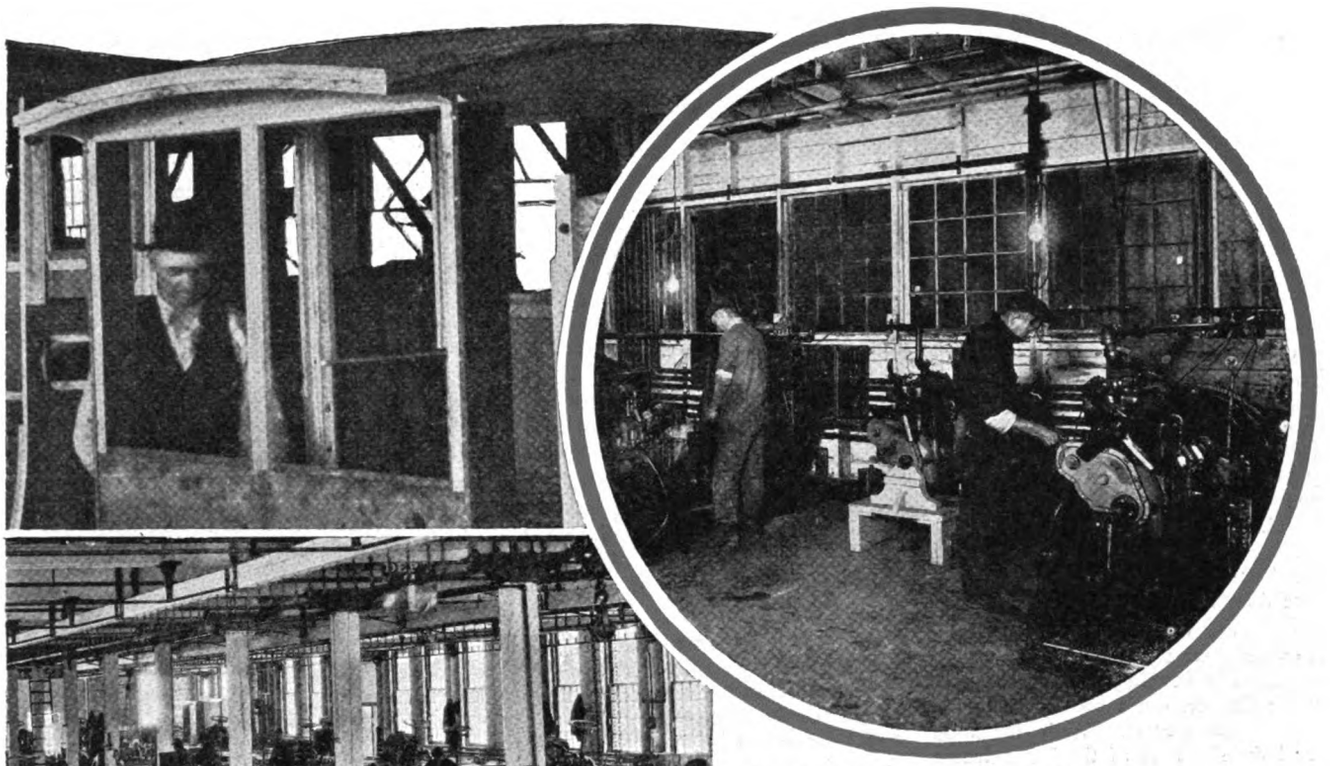
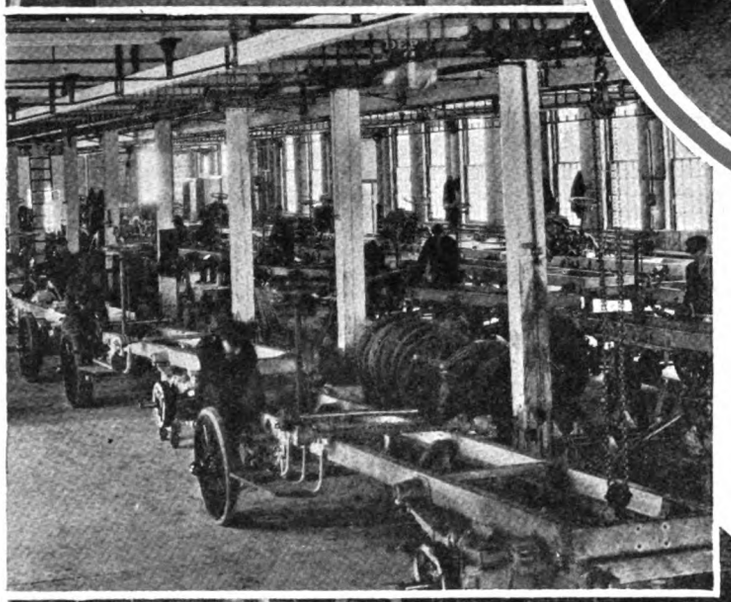
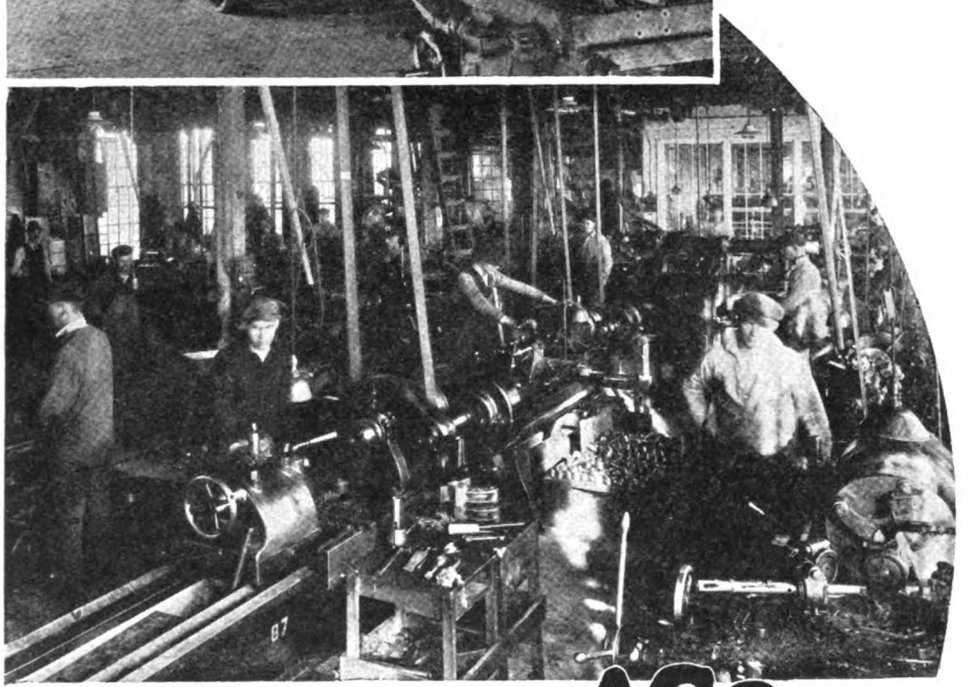


All Ace Motors are tested by the makers, but we retest for certainty.



The Ace Assembly Room puts them through



Part of the Ace Machine Shop working three turns a day.

Specifications

Modine Spirex Sectional Radiator
Timken-Detroit Front Axle
Buda Motor
Atwater-Kent Distributor
Brown-Lipe Multiple Dry Disc Clutch
Brown Lipe Transmission
Brown-Lipe Control
Ross Steering Gear
Spicer Universal Joints
Timken-David Brown Worm Drive Rear Axle with Hotchkiss Drive
Mather Springs
Parish & Bingham Frame
Dayton Cast Steel Wheels
Firestone Tires

Special Standard Equipment

Steel Channel Bumper
All-weather Cab
Westinghouse Self-Starter
Westinghouse Generator
Westinghouse Electric Lights with Dimmers
Special Device to make Headlights track automatically with front wheels
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Fully Painted

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How Small Canadian City Collects Garbage

By H. W M. MEECH

Commissioner Public Works, Lethbridge, Canada

LETHBRIDGE is a city of about 13,000 inhabitants in the southern part of the province of Alberta, Canada, about 48 miles north of the international boundary, writes H. W. Meech in *The American City*.

The city is the center of a large irrigated as well as dry farming area and is built on a bed of coal along the curving banks of the Old Man River. The city has a liberal allowance of parks and is not very thickly built up, and for these reasons is scattered over a large area. This means very long hauls of garbage for a city of this population, some portions of the outlying residential districts being fully three miles from the dump.

The garbage is dumped over a steep cliff on the extreme west end of the city and is kept continually burning. Until early in 1918 the collection outfit consisted of five single-horse dump-carts. With the long hauls and the slowness of the horse-drawn carts, garbage collection was not on an efficient basis and numerous complaints were received.

Early in 1918 the situation was seriously considered by the city commissioners, and as a result of their deliberations a 2-ton motor truck with an hydraulic lift for dumping was purchased. This was an excellent move, but it soon developed that in order to bring about the desired results scientific handling of the collection system was necessary.

The author went carefully into the question of getting the most work out of the motor truck, and it was evident that, while it was not capable of taking the place of the complete old outfit of five horses and carts, it could take the place of four. The object in view was to give the compact business district a daily collection service, some smaller outlying stores and apartment houses a service every second day, and the whole of the residential districts a weekly service. This was a better service than had ever been attempted before.

The motor truck was obviously most economical for long hauls, and fortunately the business district was fairly near the rubbish dump. A single horse and cart was therefore put on the short hauls to give the business district a daily service, and all the longer hauls were taken care of by the motor truck. Outside the area of collection by horses the city is divided into six districts and each district is covered daily by the motor truck. The day's work is so arranged that where more than a daily collection is necessary in the district the motor truck can take care of it.

It has been fully demonstrated that a reliable motor truck collecting system is far more economical than horse-drawn vehicles, but the importance of systematic routing can not be overestimated. This is particularly true of long hauls.

In comparing these figures it should be remembered that wages have been increasing over the entire period, and the item of wages for the first period if the old system had been retained would have amounted to $4,936.68, also the item of stables would have been changed by the increasing price of horse feed, etc., and the total cost if the old horse system had been retained would have amounted to $14,051.64, making a comparative total difference and saving in cost of $7,121.65 instead of $2,254.12.

The area covered by motor truck is about six square miles, and the area covered by the horse and cart is about one-half a square mile. The average weight per load by the motor truck is 3,150 pounds.

All residents are requested to put their garbage in cans or other receptacles that can be lifted easily. The necessary coöperation on the part of the citizens has been accorded the authorities. Two men, besides the driver, ride on the machine, to lift the garbage.

If we had continued the old horse-and-cart service, the difference in cost for one year would have been more than the cost of the motor truck. We are giving better service with the machine than was possible by the old system, and we have eliminated practically all complaints.

Following is a comparison of the costs of two periods, the first before the motor truck was operated and the second showing a year's motor truck service:

	Wages	Stables	Supplies	Office Supt.	Total*
July, 1917, to June, 1918	$3,085.49	$8,782.28	$ 492.38	$511.00	$12,871.15
July, 1918, to June, 1919	4,960.82	3,975.59	1,314.62	365.00	10,616.03

*The total figures in both periods include the emptying of earth closets, an amount estimated at over $7,000 annually.

COST PER LOAD FOR THE MONTH OF AUGUST, 1919, FOR MOTOR TRUCK AND HORSE AND CART.

		Cost per Mile (593 Miles)	Cost per Load (121 Loads)	Cost per Hour (206 Hours)
Gas	$ 56.38	$0.0950	$0.4660	$0.2730
Oil	11.65	0.0195	0.0960	0.0565
Repairs	16.35	0.0275	0.1350	0.0800
Driver and help	425.35	0.7170	3.5150	2.0650
Total	$509.73	$0.8590	$4.2120	$2.4745

Horse and cart, cost per load (213 loads), $0.965; total cost, $205.60.

Records of Road Commission Show Dependability of Motor Truck

Contrast between the use of motor trucks and horse-drawn vehicles in the work of road building is made in the annual report of the road commission of Cass County, Michigan. The figures show that motor truck hauling on the Wayne road is done at a total expense of 22 cents per yard mile while, the commission points out, the same work if done by horse-drawn vehicles would have approximated 62 cents per yard mile.

The report of the Road Commission referring to six Nash Quads in service on the road of Cass County, in part, is as follows:

"In accordance with the authority granted by the Board of Supervisors for the purchase of a suitable motor truck the commission selected and purchased one 2-ton motor truck which was delivered and placed in service early in the spring. The results were so satisfactory that two more were purchased, and later three similar machines were received from the State Highway Department.

"As the haul on this work is very long it is a good place to test the advantages of motor truck hauling. No team hauling was done. The work cards as returned by the drivers show that the motor trucks hauled 1368 yards of gravel to the Wayne road. 2,694 gallons at a cost of $673.50; oil used, 600 quarts which cost $60.00. The total cost for driver's wages was $832.75. The average haul was about 7 miles.

"Taking the above figures as a basis the cost per yard mile would be 16.6 cents for operating expenses while repairs and replacements have cost 5.4 cents per yard mile or a total operating and repair expense of 22 cents per yard mile.

"Comparing motor truck hauling on this same job with team hauling it would show costs about as follows: The average distance being 7 miles, round trip would be 14 miles. As two trips would be out of the question one round trip would represent a day's work which could not be obtained for less than $6.50. On a yard mile basis the cost would have to be 62 cents to enable a team to earn $6.50 per day hauling the above distance. Our experience has been that on hauls of less than one mile the difference in cost between motor truck and team hauling is not very great. But cheap hauling is not the only advantage of mechanical hauling. Motor trucks thrive in hot weather and there is no falling off in work on that account. They also will work as many hours per day as is necessary."

English Haulage Increase

A striking feature of motor haulage in Liverpool, England, and in the Merseyside towns has been the extent to which new haulage companies have lately come into existence. Of the very large number of steam and gasolene motor trucks to be met with hourly, in the districts named, almost every other one will be found to belong to some haulage company.

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Trailers and the Highways

By HARRY W. PERRY

General Manager Trailer Manufacturers Association of America

NOW that trailers are coming into more common use with motor trucks and all indications point to a rapid increase in their numbers, the question of how their use will affect the improved highways is of interest to highway authorities and the general public.

The trailer has been and still is looked at somewhat askance and with a feeling that the towing of trailers by motor trucks imposes increased burdens on the highways and somehow increases the menace to other users of the roads. The authorities are therefore inclined to throw legal safeguards around the use of trailers for the protection of highways on the improvement of which hundreds of millions of dollars are being spent annually. This is good public policy and meets with the approval of the manufacturers and users of trailers as well as of the general public; in fact, the trailer manufacturers themselves are urging the enactment of suitable legislation to control the use of trailers, just as the automobile and truck manufacturers and dealers advocate proper and reasonable laws for the regulation of motor vehicles.

No one realizes the importance of good roads better than the manufacturers, dealers and users of motor trucks and trailers. The whole future of these interests is bound up with the highway situation, because hard-surfaced, durable highways are essential to the successful and economical use of motor rtucks and trailers. Furthermore, a very large percentage of the cost of maintaining the highways is paid from the heavy license fees imposed on motor vehicles and the users of these have no desires to destroy the roads rapidly and see these fees increased to pay for such damage.

THE whole subject of suiting the highways and the traffic that uses them to each other is a particularly difficult one and there are bound to be differences of opinion as to how this should be done. It can be done only by acquiring a full knowledge of all conditions and factors, so it is necessary that the highway departments and legislators and the motor vehicle interests should get together and learn each other's problems. They can then arrive at a fair and proper solution which will result in providing the most economical system of highway transportation for persons and property. It is largely a matter of economics, the question being whether it is cheaper in the long run to provide suitable roads for motor vehicle traffic or to prevent further reduction in the cost of haulage by unduly restricting such traffic. A fair balance can be struck somewhere between the cost of highway construction and maintenance and the cost of operating motor vehicles. If too little money is spent on the roads, the consumption of gasolene, the wear and tear on vehicles and tires and the loss of time by machines and drivers become excessive. On the other hand, if relatively few excessively heavy vehicles operated at high speed quickly ruin costly roads, the temporary saving in operating costs is more than offset by the expense of repairing the highways.

The trailer, more than any other road vehicle, requires good, level roads for successful and economical service. For this reason the trailer interests favor reasonable restrictions on the size, weight and speed of motor trucks and trailers and do not object to fair registration fees for trailers provided the fees go into a fund for highway work. As a matter of equity, however, they believe that all vehicles using the highways should pay similar fees corresponding to the use made of the roads and the relative wear and tear done to them.

IT is coming to be pretty generally recognized that under good road conditions the use of one or more trailers with a motor truck reduces the cost of haulage by 20 to 40 per centum, according to the particular service and method of use. The capacity of the truck is doubled and sometimes tripled by hauling a trailer or semi-trailer. Even greater economy is obtained occasionally by hauling a train of two or three trailers. A number of municipalities in New York and other states are using fleets of trailers for the most economical disposal of ashes and garbage. In some cities the trailers are drawn through the streets by teams for house-to-house collection and then driven to a central point where three or four are coupled in a train and drawn by a motor truck several miles out of the city to a dump. The trailers have steel side-dump bodies which are carried in a drop frame so that the sides of the body are only shoulder high. This makes loading easy and saves much time of the ash and garbage men. In Utica, New York, three such trailers, of 5-tons capacity, are hauled four miles out of town by a 5-ton motor truck. Part of the route is up a curved hill with nearly a 10 per centum grade over a cinder road.

This same system would probably be adopted by Newark and some of the other cities in Northern New Jersey if the state law did not unwisely prohibit the towing of more than one trailer or semi-trailer. This provision was probably included in the law from a mistaken idea that a string of two or three trailers behind a motor truck would obstruct turns in the highway and endanger other traffic. But this is not true. As trailers are designed and built today, the wheels of all the trailers in a train follow in the tracks of the towing vehicle and will readily turn a right angle corner without crowding the inside of the turn and preventing the passing in perfect safety of a vehicle coming from the opposite direction or from behind. Such trains necessarily proceed at slow speed and the trailers do not sway or "weave" from side to side with danger of striking another vehicle. Trailer engineers have worked earnestly during the last few years and have almost entirely overcome this tendency even when the trailers are run at high speed.

Commercial houses and industrial companies seldom use more than one trailer or semi-trailer with a motor truck, although under favorable conditions two trailers will further lower their hauling costs. As they become more familiar with the use of trailers, it is probable that on long hauls, outside of congested cities, this practice will increase.

Instead of adding to traffic congestion, the use of trailers will lessen it, because a motor truck and close-coupled trailer or semi-trailer constitute a transportation unit and, by hauling a double or triple load, cut down the number of units on the road. This will be realized readily if one imagines all the cars in a railroad train being run as separate units with considerable space between, instead of coupled together in a single train and the danger and confusion that would result, particularly at grade crossings.

HIGHWAY engineers hold that the gross weight of big motor trucks with their loads is the most destructive agent to improved roads, and have often asked motor truck manufacturers to indicate the probable development as regards motor truck sizes so they would have a definite weight as a basis for calculating the supporting strength of roads and bridges. In response, the manufacturers have agreed to a total gross weight limitation of 28,000 pounds for a single vehicle with its load. This will permit the operation of motor trucks of 7-tons capacity, and the manufacturers are not building motor trucks of larger size for use on public roads outside of large cities. As a matter of fact, a 7-ton load can be hauled at less cost on a 3½-ton motor truck and 3½-ton trailer or semi-trailer than on a single 7-ton machine, and a load of 5 tons can be hauled more cheaply on a 2½-ton motor truck and trailer than on a 5-ton machine, under most conditions.

Such division of the load has a number of important advantages. Most big machines are operated the major part of the time with only partial loads, but with a trailer, the power wagons can be used alone for small loads and the trailer coupled on when the larger load is to be hauled; with a trailer, two loads of different materials can be hauled at the same time, or two loads to different delivery points can be hauled and the trailer left

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for unloading at the nearer point and picked up by the motor truck on its return from the further point; the tendency to overload the machine is avoided when the excess can be placed on a trailer; waiting time of the motor truck and driver is saved, as machine and trailer can be loaded or unloaded at different places at the same time.

Owing to the foregoing advantages, the use of trailers has a tendency to increase the demand for moderate-sized motor trucks in preference to the larger sizes for ordinary haulage work. In certain lines of manufacturing and for special haulage jobs, it is either necessary or most economical to haul single loads of 10, 15 or more tons. The semi-trailer or pole trailers are best suited to these purposes. When they are used, the weight of the load is divided between the motor truck and the trailer so there is no greater weight on any pair of wheels than where only half as heavy a load is carried on a single motor truck.

DISTRIBUTION of the weight over three or four axles instead of concentrating it on two axles is of particular importance from the road engineer's point of view and is the strongest factor in favor of the trailer. Where a heavy load is carried on a semi-trailer or trailer the gross weight is supported on six or eight wheels and is distributed over a wheelbase of 15 to 30 feet instead of about 12 feet. Moreover, the combined weight of a motor truck and trailer is considerably less than the weight of a motor truck alone of corresponding capacity. Thus, a 7-ton motor truck weighs about 14,000 pounds while a 3½-ton machine weighs about 7,500 pounds and a 3½-ton 4-wheel trailer about 3,500, or a total of 11,000 for the two. So the use of a trailer actually reduces the total gross weight on the road besides distributing it more evenly.

It is further to be considered that the weight of the trailer and its load is carried on free-rolling wheels; that is, the trailer wheels do not deliver any driving effort to the road surface tending to disintegrate it, the only effect being to roll the surface.

All of these facts furnish the ground for the claim made by trailer manufacturers that legislation should be of a character to encourage rather than to discourage the use of trailers and that registration fees for trailers should be less than for motor trucks of equal carrying capacity. In this claim they are supported by the national associations of automobile and motor truck manufacturers, dealers and users.

There are three or four states in the Union that prohibit the use of more than one trailer or semi-trailer with a motor truck and an equal number that forbid the operation of motor driven vehicles equipped with metal tires. New Jersey does both, while Vermont (a mountainous state) permits hauling only one trailer and Michigan and Wisconsin require rubber tires. Such legislation was enacted in all sincerity but without full knowledge of how trailers are used. More recent legislation in Illinois, Michigan and Massachusetts permits the operation of trailer trains 60 or 65 feet in length, which is sufficient for a motor truck and two trailers. Trailer manufacturers believe the allowable length should be 85 feet, permitting the drawing of three trailers.

All trailers for ordinary commercial purposes are regularly equipped with rubber tires either solid or pneumatic, except a few very light two-wheel trailers of a few hundred pounds carrying capacity built by carriage makers to be towed behind light passenger automobiles. And all trailer and motor vehicle interests agree that vehicles operated at speeds of more than six miles an hour over improved highways should have rubber tires.

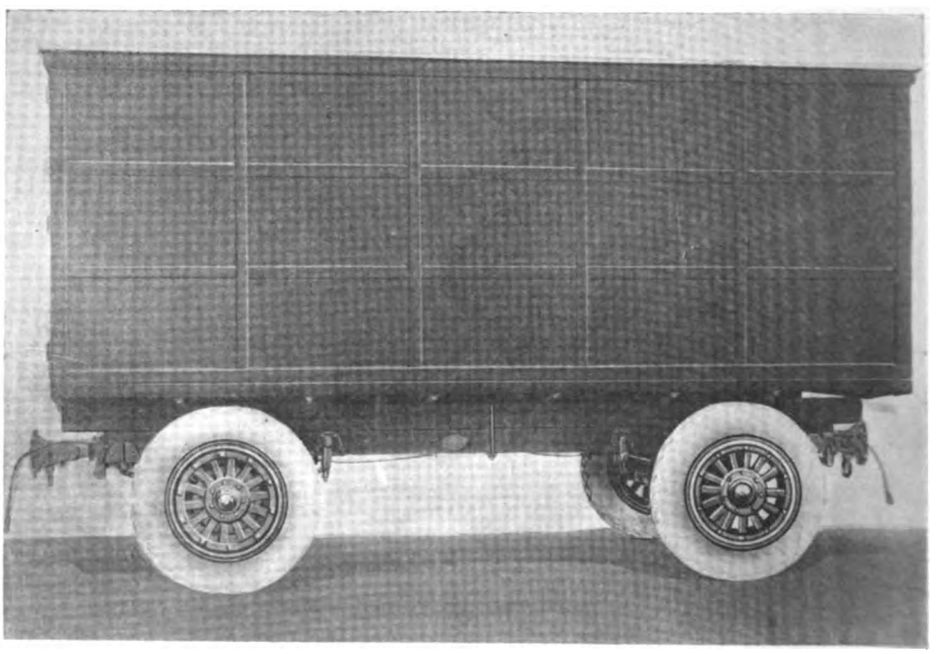
BUT in framing state-wide laws to protect improved roads, the legislatures in these few states have overlooked or been unaware of certain uses to which trailers are put and it is now seen that the laws designed to save the public money for road work may actually prevent the saving of road funds. A certain type of trailer is much used for road construction and repair work by contractors. These are slow-speed vehicles with dump bodies and are hauled in trains of two to half a dozen or even more by motor trucks, traction engines or caterpillar tractors. They are fitted with broad, flat steel tires and are operated at a speed of three or four miles an hour. They are used almost entirely on roads under construction or worn-out roads undergoing reconstruction or repair. In some remote mining, lumbering or farming sections of the country they are used for heavy haulage where there are no expensively surfaced highways. Each trailer is of about 5 tons' capacity, so that about 50 tons of road material, ore, lumber or grain can be hauled in a single train by a powerful tractor. This, therefore, affords the cheapest method of road haulage and a contractor who can use such equipment can make the lowest bid on a job of road construction. But if the state law forbids metal tires, the use of more than one trailer with a motor truck and the operation of caterpillar tractors on all public roads, whether hard surfaced or not, the state highway commission can not get the benefit of such low bids by contractors and must pay a higher cost for road building.

Special Trailer Body

The trailer shown in the accompanying illustration is of the regular 3½-ton Arcadia specification, except that the frame is 14 feet long and it rolls on 40 by 8 pneumatic tires instead of the regular pressed on 36 by 5 tires. These trailers have brakes and instead of using a lever on the trailer there is a system of direct connection with the motor truck driver from the cab. The bodies are also built in the Arcadia factory and are 16 feet long and 7 feet wide and 6¼ feet high, inside measurements. They have double doors at both ends, the bodies are very solidly built and resemble more the ordinary railway box car than they do a highway trailer body. The Arcadia Trailer Corporation is also building 24 wire screen, canopy top, freight-carrying bodies to be mounted on the motor trucks which will be used by the Public Service Transportation Corporation of Philadelphia, New York and Boston. The bodies have curtains with wire screens all around, the doors in the rear, being locked to prevent thievery. These trailers are intended for operation between Philadelphia, New York and Boston.

Scotland Needs Trucks

Motor vehicles are in good demand in the Glasgow, Scotland, consular district, and Consul J. N. McCunn reports that it will be some years before home manufacturers can supply the market fully. On September 1, 1919, there were 21,307 motor vehicles in use in this district.



Arcadia long-distance haul trailer body.

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"Natalite"—New Motor Fuel

By VIVIAN B. LEWIS

Late Professor of Chemistry at the Royal Naval College, Greenwich; Chief Gas Examiner to the Corporation of the City of London

THE enormous increase in the use of the internal combustion motor, not only for cars but for traction, makes the discovery of a cheap and universal substitute for gasolene one of the most important commercial problems of the day.

It has long been recognized that, great as are the subterranean stores of the crude oil from which gasolene is obtained, they are by no means unlimited, and with the consumption of gasolene increasing in the ratio shown by the returns of the last few years, a time must come when shortage in supply will increase the already high price of gasolene and seriously check the motor industry in its rapid advance for commercial and agricultural purposes.

For many years the use of alcohol as a substitute for gasolene as a fuel in the internal combustion engine has been strongly advocated but certain difficulties, such as inability to start the motor when cold and the necessity for high compression in the cylinder, if a power at all approximating to that given by gasolene is to be obtained, have prevented its general adoption, although in Germany and France much work has been done and very good results obtained with mixtures of alcohol and sufficient benzol to aid in starting and in increasing power.

BENZOL is obtainable at a cheap rate only in countries where the distillation of coal is on a large scale and the smallness of the supply would, if it were used to any considerable extent, increase its price to a prohibitive figure.

Not long ago I was consulted by Robert Wood as to a motor fuel he had invented, in which the troubles inseparable from the use of alcohol alone were surmounted by mixing it with a proportion of ether, which can be made by distilling alcohol with sulphuric acid. I was very much struck with the proposal as offering an easy solution to the problem of obtaining ease in starting, owing to the greater volatility of the ether, and increase in power, owing to its higher thermal value. Mr. Wood's invention had been patented.

A copy of the patent having been obtained, a quantity of the motor fuel was made according to the directions. It had a specific gravity of .7745 and a flash point below air temperature. This spirit was then subjected to laboratory tests, with the following results:

1. *Starting from cold.*—For a motor spirit to give satisfactory starting, it must be sufficiently volatile to yield enough vapor to give an explosive mixture in the cylinder with everything cold; the measure of its volatility can be obtained by noticing the height of a column of mercury which its vapor will support at any given temperature.

The most popular motor fuel and the one which gives least trouble in starting the engine from cold has a specific gravity of about 0.715. Even with this on a very cold morning a little trouble is sometimes found but it is a safe standard in judging the performance of other fuels.

In the following table the vapor pressures of this motor fuel, methylated alcohol alone, and "Natalite" are contrasted.

It will be seen from this that the vapor pressures of the alcohol are uniformly below those of the gasolene and it is this that has caused the starting troubles and the want of flexibility which has militated against its use in high speed vehicles, whilst on the other hand, Natalite, owing to the volatility of the ether which it contains, is uniformly higher than the motor fuel in question and will start with the greatest ease, no matter how low the temperature, and give perfect flexibility in running.

VAPOR PRESSURES IN INCHES OF MERCURY.

Temperature, Degrees F.	Motor Fuel.	Methylated Alcohol.	"Natalite."
60	1.4	1.1	1.9
65	2.6	1.8	3.6
70	3.6	2.7	4.9
75	4.8	3.6	6.8
80	5.9	4.7	8.2
85	7.1	5.7	10.2
90	8.2	6.9	12.3
95	9.3	8.0	14.5
100	10.5	9.2	16.9

2. Bench tests with stationary motor car engine in order to compare the power obtained in the engine by Natalite with that given by the motor fuel: The carbureter was carefully adjusted to give the best results obtainable with the motor spirit and comparative trials were then run with the two fuels—the first at 1,000 revolutions per minute—whilst a second trial was made with the speed accelerated to 1,300 revolutions.

Spirit used—	Pratt's.	Natalite.	Pratt's.	Natalite.
Revolutions	1,000	1,000	1,300	1,300
Horse power developed	12.5	10.5	16.9	15.6
Gallons per hour consumed	1.65	1.92	2.36	2.55
Gallons per h.p. hour	0.132	1.183	0.140	0.164

THIS test shows that with the normal adjustment of the carbureter for gasolene, rather more Natalite has to be consumed to give the same power at the lower rate of running, but that as the engine is accelerated the difference in favor of the gasolene rapidly grows less, so that at 1,300 revolutions 1.17 gallons of Natalite would give the same results as one gallon of the best gasolene.

Experiments were made to see if greater power could be developed with Natalite by adjusting the carbureter to give a richer mixture; under these conditions Natalite showed an economy over gasolene:

Spirit used—	Pratt's.	Natalite.
Revolutions	1,300	1,300
Horse power developed	10.1	18.85
Gallons per hour consumed	3.73	3.53
Gallons per h. p. hour	0.370	0.187

This shows that when an increase in horsepower is needed it can be obtained more readily with Natalite, whilst as the adjustment of the carbureter on a car is rarely made with the delicacy employed in these experiments, it may be safely said that for general practical work Natalite will show much the same results as gasolene.

3. *Exhaust.*—The exhaust given whilst using Natalite was carefully tested and was faintly alkaline throughout, whilst the exhaust gases were in no way offensive and no signs of corrosion or fouling were found. These tests show that Natalite can be used in any engine and carburetor made for gasolene without fear of damage to the engine.

4. *Storage, Etc.* — Although Natalite must be treated with the same precautions as gasolene, owing to its giving off inflammable vapor, yet it is far safer than gasolene, for if the spirit catches fire it can be extinguished by water, which is not the case with gasolene.

IT will also probably be found that if engines were made giving a higher pressure in the cylinder than the ordinary gasolene engine, Natalite would give far better results, as instead of the usual 8-0 pounds pressure employed with gasolene, this pressure probably could be doubled without risk of premature ignition.

The value of Natalite lies in the fact that alcohol can be made on an enormous scale in every quarter of the world, as all starch and sugar-containing bodies yield it on fermentation; potatoes, beet root, rice, molasses and grain such as barley, wheat or maize, can all be utilized for its production, whilst the alcohol so made can be caused to give the necessary ether by further distillation with sulphuric acid. The cost at which the finished spirit can be put on the market would be considerably below the price of the cheapest gasolene.

Burton Detroit Manager

Thomas R. Burton, who takes over the sales managership of the important division centered at Detroit, is a twenty-year man in Morgan & Wrights' service. He began as a salesman in New York in 1900, and nine years later was made Boston branch manager by the same company. In 1911 he became Pittsburgh branch manager for the United States Tire Company, and in 1912 went to New York as assistant to the eastern district manager. In 1914 he assumed the duties of district manager at Atlanta, remaining there until 1918 when he acted for a time as district manager at Boston

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Correspondence

General Correspondence, Criticisms, Suggestions, and Discussions Concerning Any Subject of Interest to Those Who Design, Manufacture, Sell or Use Commercial Motor Vehicles, Their Parts or Accessory Equipment, Are Solicited

Trucks for Live Stock

To the Editor: We hear it said from time to time that the peak of high prices has been reached and that from now on we may expect prices to decline. It may be that we are getting so that we do not believe it, but, whether we do or not, these are days when people are thinking more and more about the high cost of living—the relation of income to outgo, and considerations of a similar nature. Production and more production, especially of foodstuffs, is the cry that is sweeping the country.

We all want to see prices go down, and anything that will help in this direction should receive our best support. High prices are not the result of production, of inflation, or of any other single cause. Many factors enter in, and one of the big factors is distribution, which, as our population tends to become centered in large cities, assumes an ever increasing importance. Civilization itself is only the result of distribution of ideas, goods and everything that is used and made by man. The individual to-day is not self-sustaining; neither are whole cities and, were communication with the outside world to be stopped, the people in our cities could live for only a few days.

Most of us eat meat, if we can afford to do it, and here is just one place where motor trucks were able to be of great assistance. All the live stock raised on our farms must, in some manner, be distributed to us, and the more direct the route, the lower the number of profits that are made by various middlemen, the lower the price to us. Next to the question of labor, transportation is about the biggest factor in the cost of everything. Stockmen, by the use of motor trucks, can market their animals much more efficiently than they can otherwise. They can sell when the market is at its best—in other words, at a time when the demand for stock is the greatest. But even aside from the cost of hauling and the timeliness of motor service, there are many other points which are of importance both to the stockman and to us. We used to see animals driven on the hoof to market or to the shipping point from the farm—a very expensive and inefficient method, partly because of the great length of time taken and partly due to the loss in weight by shrinkage. It has been time and time again demonstrated that swine can be hauled to market by motor truck with a great saving of time and energy, and this is especially true when the hauling is done by pneumatic-tired vehicles, when shrinkage is reduced to the minimum. Most stockmen use a tarpaulin in the warm weather to shade the animals and protect them from the heat, and this, in addition to the shorter length of time taken, delivers the animals at the market in a much better condition. Motor trucks are making it possible, in many places, to haul fattened animals direct to the slaughter-house from the farm, thus eliminating the loading and unloading and rough and irregular feeding that accompany rail transportation.

The motor trucks used, however, should be selected with care in order that they may withstand the difficult operating conditions to which they are usually subjected in farm work. A few of the things that are of prime importance to the farmer who is selecting a motor truck are these:

(1) Pneumatic tires, which will enable the vehicle to travel bad side roads and lanes, and even go into the field to pick up its load, if necessary.

(2) The vehicle should have a large engine, capable of giving it when fully loaded a good rate of speed of travel in order that time may be saved.

(3) The vehicle should be flexible, because it will not travel over paved city streets, and should be able to withstand the weaving and straining to which it will be subjected in farm hauling.

We recently conducted an investigation among several thousand country agents and farm truck users as to the size best suited to farm requirements, and it is the concensus of opinion that a 1½-ton vehicle is, in general, most efficient for average farm conditions.

SERVICE MOTOR TRUCK CO.,
Rolfe C. Spinning,
Wabash, Ind. *Adv. Mgr.*

Shifting Population

To the Editor: While it is true that nearly every generation since the time of Adam has had its own peculiar problems to solve, the one now confronting America is different in many regards from any that have gone before. There are many causes leading up to the condition we are now in—the lives lost in the World War, the influenza epidemic of the past two years, the raise in wages and shorter hours for common labor, the fact that when America's stalwart sons left the farms and small cities in response to the draft, many of them upon return to civil life chose to remain in the cities rather than return to the farm. Other causes for the shortage of manpower on the farms of America—and this, by the way, is the problem of the age—is found in unfavorable crop and weather conditions prevailing in some parts of America during the past two years, the high price of everything the farmer has to buy including farm tools, necessary building replacements, clothing and some few articles of food and the general unrest and discontent so prevalent in all parts of America, a state of mind not helped by the stories heard on every side of great wage increases in the cities, extravagance and reckless spending on the part of wage earners in all the great industrial centers, the charges of profiteering brought against practically every line of business, in many cases by people themselves accused of profiteering by others. This has all had an effect, in many cases whetted the appetite of the farmer for his share of the gold he believes is his for the taking in the city, resulting in thousands of abandoned farms in all parts of America, but more particularly in the less fertile lands of our country so that now no less an authority than Herbert Hoover said that, unless the rush from the rural districts to the city was stopped, we would within five years be forced to import food from Europe or starve. Seeking for happiness in the turmoil of the city on the part of the farmer is akin to searching for the pot of gold at the foot of the rainbow—neither one can be found. It is true that farm work is hard, hours during the summer months are long and very much must be crowded into the time between sunrise and sunset each day.

So much for the problem—now for its solution, which is found in the motor truck, trailer and tractor. The tractor will enable the farmer to prepare ten acres of ground for corn, oats, potatoes, beans, wheat, etc., as easily and as quickly as he formerly prepared one. The truck and trailer will enable him to pick his market and haul his products in a fraction of the time required by team, deliver his live stock to market without loss of weight and time, speed up his work in every way. In other words the truck, trailer and tractor will make it possible for the farmer to produce ten heads of wheat where one grew before and do it quicker, easier and with one tenth the time and labor. With a farm thus equipped, one man and one helper can not only increase production of food stuffs, but change the occupation of farming to the business of agriculture and from plain, every day, weary drudgery to fascinating, profitable business, clean-cut and wholesome, change it from a more or less humdrum existence to a pleasing and highly remunerative one. When times change, as they will do in the near future, and the insane and deadly rush to the city is stopped, the motor truck, trailer and tractor will have been the means of stopping it and the business of farming will be recognized as on an equal footing in importance and desirability with manufacturing and far, far above the mere task of working six to eight hours per day and having barely enough in the pay envelope when pay day comes (no matter how bulky that envelope may have grown) to pay the butcher, baker, grocery man, landlord and all the others.

ACME MOTOR TRUCK CO.,
Cadillac, Mich. W. A. Carpenter.

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Golden Gate to Be Horseless Within Five Years Says Prophet Tax Man

In five years there will not be a horse-drawn vehicle in the streets of San Francisco. This is predicted from an examination of the city's records for the last four years, which shows a rapidly decreasing number of licenses for this type of commercial vehicles and a vast increase in the use of automobile trucks.

The figures which spell "finis" to the horse as a pedestrian in San Francisco's streets are made public by Tax Collector Edward F. Barber. Many inquiries have been made by the automobile trade regarding the actual number of horse-drawn vehicles still in operation and their relation in number to the automobile trucks now in use. He says:

Since the fiscal year, 1915-16, the number of commercial vehicles drawn by horse-power, including hacks, delivery wagons and trucks, has decreased by over 60 per centum, while the number of automobiles licensed for commercial purposes, including taxicabs, has grown nearly 300 per centum.

In 1915 there were 9175 horse-drawn commercial vehicles in the city of San Francisco. In 1916-17 the number dropped to 7558, a decrease of about 1600. In 1917-18 the drop was still greater, only 5583 licenses being issued. In 1918-19, the last fiscal year for which figures are available, the number dropped to 4216, about 5000 less than in 1915-16.

The number of automobile trucks, delivery cars and taxis in San Francisco during 1915-16 was 2715. The next fiscal year noted an increase of over 40 per centum, the number of truck licenses being 4177. In 1916-17 the number jumped to 5715, and in the last fiscal year to 6616, an increase in four years of nearly 4000 automobile trucks, light delivery cars and taxicabs.

In 1916 there were still 18 hacks, 2 coaches and 5 one-horse cabs paying municipal licenses. In 1917 there were only 2 hacks and 2 cab licenses, and now there are no horse-drawn passenger vehicles operating in the city.

At present there are only 1973 one-horse wagons used in the city, less than 450 two-horse trucks and 103 four-horse heavy hauling wagons.

Fuel Imports

The importation of paraffin and motor spirit into England in the month of January showed a material diminution as compared with a year ago, for it only amounted to 10,796,518 gallons of paraffin as compared with 16,500,000 in January, 1919, whilst the gasolene importation amounted to 7,580,032 gallons as compared with 17,880,000 gallons in January, 1919. In addition, 1,500,000 gallons of crude petroleum were imported, as well as a large amount of gas oil and fuel oil.

The estimated cost of maintaining and operating a wagon and team of horses is 38 cents a mile; the cost of a motor truck is 15 cents for the same distance.

Semi-Trailers, Tractors Are Taxable

By H. W. PERRY
General Manager, Trailer Manufacturers' Association

WASHINGON, March 16.—In revising its rulings on excise taxes on sales under the Revenue Act of 1918, the Commissioner of Internal Revenue, in Treasury Decisions 2989, approved March 3 and just issued, has reversed his rulings of last year as promulgated in Regulations 47, with regard to tractors and trailers forming a semi-trailer combination.

The Revenue Act itself specifically exempts tractors from taxation and nowhere mentions trailers or semi-trailers. The regulations issued last year say: "The act specifically exempts tractors, even if sold in combination with a trailer," and also says "Automobile trailers, regardless of the number of wheels which they may have, are not parts of or accessories for automobiles."

How completely the Revenue Office has reversed itself is seen by comparison of the foregoing with the new decision just issued, in which it is held that a tractor is a machine "designed to draw or pull," but that "tractors or semi-tractors which carry a portion of the load are taxable as automobile trucks;" that "trailers are not taxable," but that "so-called trailers or semi-trailers, designed so that a portion of the load or weight thereof is carried or borne by the tractor or semi-tractor, are taxable as parts of automobile trucks."

Under the law automobile trucks are taxable at 3 per centum and automobile parts at 5 per centum. However, the new decision states that "an automobile truck or automobile wagon formed by joining together a so-called tractor or semi-tractor . . . and a so-called trailer or semi-trailer is taxable as a whole as an automobile truck," that is, at the rate of 3 per centum, but when the two are "sold separately, the so-called tractor or semi-tractor is taxable as an automobile truck or automobile wagon (3 per centum) and the so-called trailer or semi-trailer as a part" (5 per centum).

If the reader fails to follow the foregoing he should blame the mental genuflections of the interpreters of the law, which is almost as popular a favorite as the Volstead act, both made particularly pleasing by seemingly zealous endeavors to construe them so they will be easy to understand and cause as little inconvenience and annoyance as possible.

How a machine can be a tractor and tax free when it draws a 4-wheeled trailer and an automobile truck and taxable at 3 per centum when it draws a semi-trailer, and how a semi-trailer can be an automobile truck when sold with a tractor and taxable at 3 per centum and an automobile part when sold separately and taxable at 5 per centum would require a Solomon to explain.

Trailer manufacturers, relying on the regulations issued last year, have collected and paid no taxes on trailers or semi-trailers. Had they done so they would have been liable to a fine of $1,000 or imprisonment for one year, or both. Whether or not it is the intention of the Treasury Department to make the decisions of March, 1920, retroactive is not known. To do so would impose unjust hardship on the manufacturers, who can not now collect the tax from last year's purchasers.

Car Shortage Causes International to Utilize Ship-by-Truck Method

Motor trucks "Shipped-by-Truck" is being practiced by the International Harvester Company, at its Akron, Ohio, plant, where more than 300 machines have been driven away from the factory within the last two months.

The most recent instance of this method of delivery was completed successfully recently when a caravan of 24 new motor trucks was dispatched overland from Akron to Harrisburg, Pennsylvania, where they were accepted by the Harrisburg dealer for immediate delivery to customers. Eight 2-ton motor trucks bore as many ¾-ton machines, and eight 1½-ton power wagons accompanied them under their own power.

An earlier demonstration late in February, when a fleet of motor trucks carrying others of lighter weight were sent to the same destination, battling their way through the snow and over the icy mountain roads in the Appalachians, had proved the plan to be practical.

"We Must Ship by Truck; We Can't Get Cars," ran the slogan which the machines carried. If the freight embargo is continued it is predicted the company will resort more frequently to this efficient method of delivery. The motor trucks arrived at Harrisburg, approximately 400 miles from the Akron factory, after a three days' drive.

Reo Makes Changes

F. L. Waite, formerly advertising manager of the Reo Motor Car Company, Lansing, Michigan, has severed his connection with that company. F. H. Akers, sales manager for Reo, continues in general charge of the advertising as sales and advertising manager. The advertising department has been merged with the sales promotion department under the immediate direction of Walter K. Towers, sales promotion manager.

The manufacture of rubber products, which in 1919 became a billion dollar industry in the United States alone, is consuming rubber at the annual rate of 350,000 tons.

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Among Dealers and Distributers

News Concerning the Appointment of New Dealers, Changes in Agency Connections, Increases in Capitalization, Election of New Officials, and Additions to Salesrooms and Service Stations

Reynolds Motor Truck Sales Company, a subsidiary of the Reynolds Motor Truck Company, of Mt. Clemens, has been organized in Detroit to handle the company's sales in the Detroit territory.

Troy Tractor, Truck and Equipment Company, of Troy, Pa., is the name of a new business organized recently. The new company will handle the full International Harvester Company's line of tractors, trucks and implements. The officers are J. H. Preston, president; J. Stewart Essenwine, vice-president; J. C. Blackwell, secretary; H. J. Pierce, treasurer.

E. E. Wagner has opened in Danville, Ill., an agency for Bethlehem motor trucks. The old Dixie garage, 130 Walnut street, has been remodeled and altered to meet the needs of the new agency.

W. T. Clapp, who has been manager of the Menominee Motor Truck company, of Minneapolis, since last May, has purchased this branch, which consists of a full stock of repairs and several motor trucks, and has the agency for the Menominee for the state of Minnesota.

Hawkeye Export Company, Detroit, has been formed to handle for export the product of the Hawkeye Motor Truck Company in Sioux City, Iowa. Forrest Cheffer is vice-president, and David Levyn is secretary and treasurer of the export company.

P. C. Chrysler, one of the old guard in automotive circles, has joined the Rainier Motor Corporation as assistant to the sales manager, P. N. Lineberger. He has been in the motor truck business from the beginning. No man knows the game better than he, and his many friends will be glad to know of his connection and to wish him well.

W. J. Mead has been made distributor in the Chicago district for Commerce motor trucks. Mr. Mead intends to open service stations on the north and south sides of the city, and a downtown office.

Mathews, Neitzel & Company, of Milwau- has been appointed the new Wisconsin distributor for Indiana motor trucks. The firm has been handling Chevrolet cars for the last two years and has built up a strong organization.

DeFord Motor Truck Company, of Detroit, Michigan, distributor for Diamond T motor trucks, has opened a temporary office and salesroom at Cass and Prentis avenues, Detroit. These will be occupied until the company's building on Second avenue, now in course of construction has been completed.

I. D. Cross, who has been representing the Northwestern Chemical Company, of Marietta, Ohio, manufacturers of Norwesco in the western states, was recently promoted to western sales supervisor. Mr. Cross is an experienced salesman of automotive equipment and will now have charge of the entire western territory.

Stewart-Warner Speedometer Corporation, Chicago, is to open a branch house in Peoria, Illinois, April 15, the only one in the state. The building at the corner of Franklin and Madison streets has been rented. Daniel Hyland has been appointed manager.

Universal Piston Ring Company, Rockford, Illinois, has been incorporated with capital stock of $100,000, and will manufacture its product at 1026 Charles street until permanent quarters are secured. Officers have been elected as follows: President, William Stenlund; vice-president, G. W. Hamlin; secretary, Richard F. Clapp; treasurer, W. P. Burdick; manager, W. G. Burdick.

Rockford Motor Car Company has been organized at Rockford, Illinois, with Arthur L. Johnson as president; Earl Bengston, vice-president, and Howard Ryan, secretary. Capital stock has been fixed at $100,000. The company will be distributers of White motor trucks, and also a complete line of tires and motor vehicle accessories. Mr. Johnson has for many years conducted a bicycle and motorcycle agency and repair shop. He has disposed of these lines and will hereafter devote his attention exclusively to motor trucks and accessories.

J. H. Chambers will be distributer throughout fifteen counties of northern Ohio for the Jackson motor trucks, made by the Jackson Motors Corporation, Jackson, Michigan.

Powell G. and **Richard L. Stratton** have taken the dealership in Staunton, Vinginia, for the White motor truck, dealing under the name of the White Truck Sales Company.

Charles E. Koehler and **C. S. Dean** have taken over the Federal Sales Company, of San Antonio, Texas, distributers for the Federal line of motor trucks. The new firm will operate under the name of Koehler-Dean Truck Company, and will occupy the quarters that the Federal Sales Company has been using.

Claude L. Thomas Automobile and Tractor Company, Bowling Green, Kentucky, has taken the agency for the complete line of Nash automobiles and motor trucks. The line consists of six models of passenger cars and three models of motor trucks.

P. S. Manley, formerly salesman at the Portage Chicago Branch, has been appointed branch manager at Milwaukee. Mr. Manley has had considerable experience in the rubber industry, formerly being one of the leading salesmen of the Empire tire and later of the Brunswick. Six salesmen have been assigned to work out of this branch.

Garford Builds Addition

The Garford Motor Truck Company, Lima, Ohio, has broken ground for a large addition to its present plant. The new building is to be 100 feet wide by 420 feet long, and will be devoted entirely to progressive assembly of Garford motor trucks. The building will be of concrete, steel, and glass construction, with two full floors. There will be three chassis assembly conveyors in operation, and at the far end the chassis will roll out under their own power, complete and ready for test. It is anticipated that the building will be ready for occupancy by June 1, with complete equipment, and will be one of the finest examples of progressive assembly methods in the country. It is estimated that these increased facilities will enable the Garford company to double its output during 1920.

The Available Truck Company in offering to the trade its new 1920 catalog covers a field in motor truck making that is very broad—broader in scope than that covered by most examples of trade literature of similar nature. With respect to Available product the booklet is historical, and at the same time shows in most pleasing and convincing manner the modern methods applied in the manufacture of a modern product. The catalog is richly illustrated and as richly printed. Every detail of the booklet shows careful attention and all together it is a worthy representative of the machine of which it is the silent salesman.

Rochester, New York, will have its own system of mail transportation with from thirty to thirty-five motor trucks operating on delivery and transfer of mails. The motor trucks will range in capacity from ⅜-ton to 1½-tons.

Oil tank of 2,500 gallons capacity on Mack chassis.

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One Truck Equals Work of 26 Two-Horse Teams

MACHINE HAULS LUMBER IN ARKANSAS

When the Federal motor truck distributer at Little Rock, Arkansas, told the Wm. F. Rapp Stave Company, Pine Bluff, Arkansas, that a Federal heavy duty tractor with 6-ton trailer would haul a ton mileage equivalent to that of 26 teams, the Rapp company was naturally skeptical and inclined to think that it could not be done. However, an actual demonstration produced the results, with the following interesting figures as to how it was done.

The mill is located eight miles from the railroad, and a good team of horses was only to make six trips per week, loaded with 300 staves, at 8 pounds each, or a total of 2,400 pounds—1.2 tons. That is, 9.6 ton-miles per day, or 57.6 ton-miles per week.

The tractor on actual demonstration made five trips per day, and is still making the same number, with a load of 1,560 staves per trip. At 8 pounds per stave, this figures 12,480 pounds per trip, or 6.24 tons—49.92 ton-miles per trip—249.6 ton-miles per day—1,497.6 ton-miles per week. This divided by 57.6—the weekly ton-mileage of a team, is exactly 26.

From a standpoint of tonnage alone the one tractor with trailer does exactly the work of 26 teams, to say nothing of economy of operation and speeded up delivery. Look at those figures again from the point of view of tons carried. The tractor and trailer hauls 31.2 tons per day—against the 7.2 tons per week of the team—4.33 times as much tonnage per day as the team formerly hauled each week—or 26 times as much tonnage per week. Or again, the 6.24 tons per trip of the motor equipment is almost the equivalent of the weekly haul of 7.2 tons of the team.

What little road—or trail—there happens to be on this haul is anything but good, as it is right through the woods with several long hills, the steepest being 8 per cent grade with deep sand deposits at the foot of each hill. Needless to say the motor equipment supplanted the horse-drawn.

This is only one instance of the remarkable things that the increased use of motor trucks has done for the lumber industry lately, particularly in the Southern States. The daily rising cost of labor and production, together with the increased demand for fine woods for cabinet work and veneer and the amount of building now being done, have caused the lumber industry to make a thorough study of its transportation problems in order to get the utmost efficiency possible. In the South, where roads are none too good at best, this has stimulated the use of heavy motor transportation to a great extent.

Figures are available from representative firms in every branch of the lumber industry, production, wholesale and retail, showing how their adoption of motor transportation has multipled their ton-mileage.

They are now able to get out more loads and bigger loads with increased economy in labor costs, operation and maintenance. Loggers are getting out the timber more rapidly, the millers and jobbers marketing the lumber more efficiently.

Island of Trinidad Tells Mother England Her Motor Truck Needs

The Trinidad Automobile Association in answer to a letter of the Association of British Motor and Allied Manufacturers (Ltd.), of England, asking certain questions as to desirable types of motor cars, gave the following standards:

A wheel track of 56 inches is sufficient for the average type of automobiles in this colony; the minimum ground clearance of both touring and commercial cars should not be less than 8 inches; the wheel base on heavy touring and commercial cars should not exceed 125 inches, and in the case of light cars should not be more than 108 inches; 20 feet may be considered normal radius for turning circle.

There has lately been an increasing demand in Trinidad for motor trucks, and the more such motor trucks come into the market and their economic usefulness is demonstrated the more are orders given for their importation from the United States. But it has been difficult for local agents to get orders filled by American manufacturers, who seem too busy with their home market to trouble with this export trade, and the demand has been partly met by building motor truck bodies on second-hand chassis. It is understood that about 40 or 50 motor trucks are under order for Trinidad from the United States. When these arrive the existing number of motor trucks in this colony will probably be about double.

One-ton motor trucks find a very important use here in hauling cocoa from the estates to the railway stations. Also some of the large merchants are now using 1-ton machines with imported bodies for store deliveries. For the motor trucks used for conveying of cocoa the bodies can be made locally, but there is a tendency to make them unnecessarily heavy in proportion to the strength required.

The local companies engaged in the production of mineral oil are now using 2½-3- and 3½-ton motor trucks for hauling pipes and heavy machinery. There is also some use of caterpillar tractors with trailers for such purpose. One-ton machines cost in Trinidad about $900, 2 tons, $3,500, 2¼ tons $4,000, and 3-ton trucks $4,500.

The duty on motor vehicles entering Trinidad is 8 per centum ad valorem, British preferential tariff, and 10 per centum ad valorem, general tariff.

Knowles Is Promoted

E. B. Knowles, for the past fifteen years associated with the brake lining business, has recently become secretary and general manager of the Staybestos Manufacturing Company. Mr. Knowles was for years with the Raybestos company and for the past seven years with the sales organization of the Thermoid Rubber Company.

U. S. Monopoly on World's Supply of Molybdenum

COUNTRY INDEPENDENT IN ALLOY MARKET

The United States contains 80 per centum of the worlds supply of molybdenum, according to L. B. Phillipson, president of the Climax Molybdenum Company, and as a result of this monoply would be independent of steel alloys, now secured by importation, in the event of complications that would shut off foreign supplies and otherwise seriously cripple the steel industry in this country.

"There are only five commercially practical alloying elements," Mr. Phillipson stated, "these are nickel, vanadium, chromium, tungsten and molybdenum. The United States is compelled to import the first three elements. The fourth, tungsten, while it still is being mined in this country, is rapidly becoming exhausted and very soon will have to be imported. But it has a monopoly on molybdenum ore, and, if ever we were shut off from supplies of nickel, chromium, vanadium or tungsten, we would still be in a position to manufacture alloy steel that would not only satisfy our own requirements but would even surpass the steel of other manufacture.

"About the time of the outbreak of the war, great molybdenum deposits were discovered in Climax, Colorado. This stimulated experimentation, and, after countless numbers of tests in the largest steel mills, molybdenum steel of an eminently satisfactory commercial value was produced. It filled every requirement made of it during the war.

"Its availability now for the use of peace promises in itself radical change in our steel industry, particularly the manufacture of automobile and airplane parts where a strong but light metal is needed. It is estimated that a reduction of from 25 to 33 per centum in the weight of automobiles will be found possible through the use of molybdenum steels. This means lighter cars and greater gas mileage besides other materials economies.

"I count the production of molybdenum steel to be one of the war's momentous contributions to science and industry. The fact that the United States practically controls the world's molybdenum supply adds weight to the important position occupied already by the new super-steel. In fact, it is all American. It was produced by American metallurgists and manufacturers experimenting in American mills.

"Molybdenum is being taken from the mines at Climax, Colorado, at the rate of 1,000 tons a day and the deposits, at this rate of production, assure a steady operation for more than 30 years."

Howard Promoted

The Packard Motor Company of Pittsburgh announces the election of Hartley Howard, Jr., as vice-president. Mr. Howard has been associated with Packard in Pittsburgh for the past ten years and his promotion comes as a recognition of faithful service and proven ability.

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News of the Manufacturers

New Factories and Branches, Dividend Declarations, Increases in Capital, Election of Officers, and General Development of the Manufacturing Industry

Commerce Motor Car Company, of Detroit, has purchased two more acres of land adjoining its plant, and as soon as the additions now under way are completed, will begin further building operations. The company expects to double its production of 1- and 2-ton motor trucks this year.

S. F. Bowser & Company has organized a subsidiary company to be known as the S. F. Bowser & Company of Texas, for the sale and distribution of Bowser products in that state and parts of the adjoining states of Oklahoma, Arkansas and New Mexico. The company has at present an office in Dallas, but under the provisions of the plan this place will become the home of another company to take care of the Bowser interests.

E. F. Paepper, formerly of the Republic Motor Truck Company, Alma, Michigan, and the All-American Truck Company, is now chief engineer of the Superior Motor Truck Company, Atlanta, Georgia.

Multibestos Company is the new name of the Standard Woven Fabric Company, of Walpole, Massachusetts. The Multibestos Company is engaged in the manufacture of Multibestos brake lining and Multibestos clutch lining.

Peerless Storage Battery Company, Louisville, Kentucky, makers of Peerless Red Cap storage batteries, has filed amended articles of incorporation, changing the firm name to the Wolke Lead Batteries Company, and has registered the name Wol-Kee Red Cap for its starting and lighting batteries.

Standard Motor Truck Company has appointed Hamilton Clive central territorial sales manager. Mr. Clive formerly was in the east for the company.

Frank W. Ruggles, president of the Republic Motor Truck Company, Inc., Alma, Michigan, announces the retention of Theodore F. MacManus, Inc., Detroit, as advertising counsel for that company.

John Squires has resigned as assistant general manager and chief engineer of the Denby Motor Truck Company, Detroit, Michigan. Mr. Squires has made no announcement concerning his future plans.

C. J. Helm, secretary of the Acme Motor Truck Company, declared that prospects are good for a business totalling $5,000,000 this year. A new wing will be built to the plant and the office building will be enlarged.

International Motor Company, of New York, announces the opening of another branch at 1426-28 Central Avenue, Cincinnati, Ohio. The branch will operate under the name of the Mack-International Motor Truck Corporation, superseding the James Kidney Company, who were Mack dealers in that territory. G. K. Ross will be in charge.

McClaren Rubber Company, Charlotte, N. C., has just completed a large chemical testing laboratory. H. L. McClaren, president of the company, reports that McClaren production is rapidly increasing and shortly further additions to the manufacturing plant will be made.

Transport Truck Company, of Mt. Pleasant, Michigan, has sold its output for months to come, it is announced by M. A. Holmes, president of the company. The production schedule from January 1 to July 1 calls for 1,560 vehicles

VanBriggle Manufacturing Company, to be incorporated at $1,000,000 and to operate plants in Mooresville, Indiana, and Fowler, Indiana, has been announced. The Fowler Trailer Company at Fowler and the H. M. Smith Manufacturing Company, of Mooresville, will be taken over by the new concern. L. H VanBriggle, president of the VanBriggle Motor Device Company, will be president of the firm and other officers, who will also be incorporators, are George A. Weidley, first vice-president; Frank Hilgemeier, second vice-president; U. Z. Wiley, secretary; Henry S. Rominger, treasurer, and Joseph F. Sheppard, assistant treasurer.

Detroit Transportation Truck Company, of Monroe, has begun the manufacture of motor trucks at the rate of one daily. Production will be increased as rapidly as manufacturing facilities will permit.

Portage Rubber Company, Barberton, Ohio, announces the appointment of F. N. Hammond as special representative of the sales department. Mr. Hammond is well known among tire men and has an extensive knowledge of the needs of the retail industry.

Supply Trucks Solve Problem of Ice Deliveries to Horse-Drawn Wagons

Just how to solve the one big problem of the city iceman, how to deliver to customers at outlying points in the city, miles from the big ice factory itself, has long been a problem to American refrigerating interests until now a great motor truck, adapted to this purpose, has come in. In Cincinnati, where the experiment has been made and is pronounced most unqualifiedly a success, one great ice company uses six such motor trucks, each of 5-tons capacity. Other, more usual ice wagons leave the factory fully laden on schedule and travel their several routes as before, delivering from house to house.

The truck drivers, however, know approximately when and about where such wagon will be empty, and then, instead of it making the long trip back to the factory, or to some ice depot, it has the ice truck meet it. Three wagons can be filled from the supply truck each trip from the factory, and while these three are delivering, the motor truck returns to the ice plant for another supply. The problem of transferring ice from motor truck to wagon is easy: Truck end and wagon end are backed together, skilled men with tongs take hold and shove the blocks as desired, the chauffeur lends hand, and in a very few minutes the work of exchanging load is done. After these morning deliveries to wagons—perhaps three or four to each—the big motor trucks are employed in hauling wholesale ice supplies to butchering establishments and others buying in quantities, in the afternoon trade.

Reference Book Errata

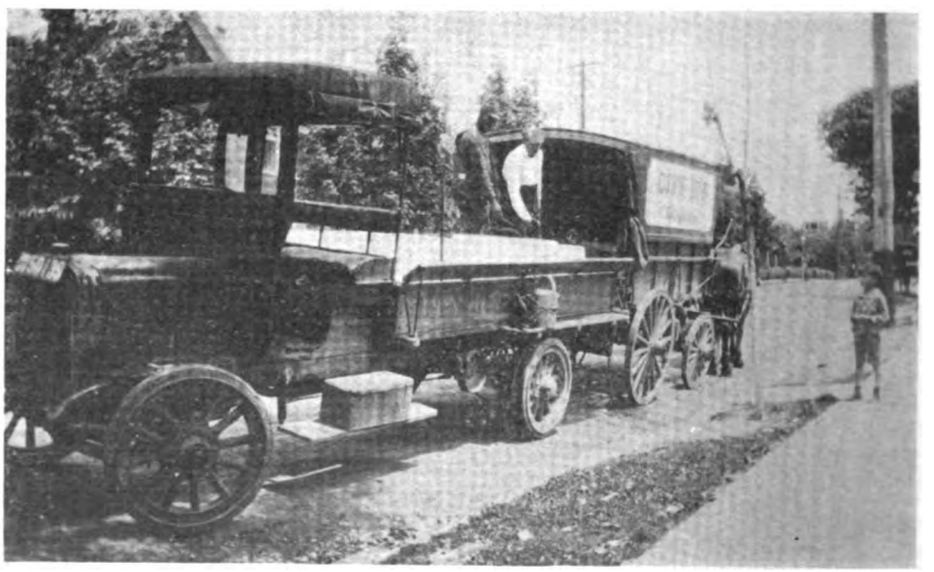
The following errors will be noted in the 1920 REFERENCE BOOK and allowance made for them:

Pages 402 and 403.—These pages are transposed, and for that reason all specifications must be read first on the right-hand page and then on the left-hand page.

Page 328.—In Table I, under the headings "Value of Machines" and "Value of Fleets," the money value is in each state and geographical division just one hundred times as large as it should be. The error can easily be rectified by simply marking out the last two zeros on each of the lines mentioned and disregarding the position of the commas. The total figures are correct and should not be disturbed.

Page 816.—The table of wheel and tire data referred to near the end of the second paragraph of the article Wheel will be found on page 803.

Page 596.—The address of the Rock Island Plow Company should be Rock Island, Illinois, instead of Rockford as given.



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The only reason why Smith Wheels are hubless is, we know that the hub cast integral wheel for motor trucks is not the right type of wheel for the purpose. We have learned this from our vast experience and observation in designing and building all kinds of metal wheels for various uses.

Smith Wheels at all times give satisfactory, dependable service. That is why they are guaranteed forever.

Smith Wheels are supplied to the truck maker when wanted. The making of trucks is not held up for lack of them. Our deliveries of Smith Wheels eliminate excuses and their service results and appearance also help to make their big sale.

Our desire is always to convince by facts. There is a world to be learned about metal wheels.

SMITH WHEEL
SYRACUSE N.Y. U.S.A.

Please mention "Power Wagon" when writing to advertisers.

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Legislation and Legal Decisions

Comments on Current Legislation Affecting Sale and Operation of Machines Together with Answers to Questions Will Be Found in This Department Each Month

By A. KALISKY
Attorney-at-Law, New York City.

BECAUSE of the alarming increase in the number of automobiles stolen, which has greatly increased the work of police departments within the last year, the New York State Bureau of Municipal Information of the New York State Conference of Mayors and other city officials, at the request of the conference's Public Safety Committee, requested the Police Departments of all New York state cities and the fifty largest cities in the United States to describe their present methods of handling automobile thefts and to send suggestions for the consideration of federal, state and local legislative bodies and owners and manufacturers of automobiles. Various methods have been adopted by the police to detect automobile thieves and to stop the activities of this class of criminals. A summary of these follows:

As soon as a car is reported stolen, a description is telephoned to all patrolmen and to cities and towns. If results are not obtained within a certain time, postal cards or bulletins giving a description of the car are mailed to a large number of cities and villages.

Police watch automobiles parked and those unattended on the street.

Automobiles not properly lighted at night are stopped and examined.

PERSONS arrested for automobile stealing are photographed and their finger prints taken.

"Planting methods" used. (Place a car in a certain place and watch it.)

Establish index card system of cars reported stolen.

List and check up at stated times all public garages, paint and repair shops, storage places and junk yards.

Require all public garages and dealers to report daily all cars handled.

Establish auto recovery bureau or motorcycle theft squad or detail members of force especially to handle complaints about stolen automobiles.

Urge owners to place locks on their cars.

Have garages take numbers of all strange cars.

Place in each garage a bulletin of every car reported stolen.

Have dealers and garages report all suspicious looking cars.

Watch men loitering about places where cars are parked.

Educate public to be careful about leaving cars in exposed places.

Cover with motorcyclemen roads leading out of city when a car is reported stolen.

Require garages, salesrooms, repair shops, machine shops and dealers to keep for public inspection a record of purchases and sales and all cars repaired.

Enforce rule that operator must have registration card with them.

Urge courts to punish thieves more severely and to parole as few as possible.

Print and distribute bulletins describing all cars reported stolen.

Require patrolmen to report cars on streets at unusual hours of night or in out of the way places.

Watch shipment of cars outside of city by transportation companies.

Inspect public conveyance before licensing them.

Print and sell to owners and insurance companies postal cards describing stolen automobiles. These are sent by department to prepared list of cities and towns.

Take numbers on cars found and forward them to manufacturers.

Require that applications for licenses on rebuilt cars be approved by the chief of police.

Instruct police to take to garage all cars found on street after midnight and the owners of which can not be located. These are held pending an investigation by the police.

THERE is a demand from every section of the country for laws requiring an abstract of title and for the licensing and regulating of dealers and those who repair automobiles. Many police officials also advocate an inspection of cars, before licenses are granted, a more severe punishment of persons convicted of automobile stealing and the establishment of a federal and state registration bureaus or clearing houses. Following is a summary of suggestions for legislation:

Federal law governing the theft of automobiles, so that cases will be tried in federal instead of local courts.

State law requiring all dealers and the proprietors of garages, paint or repair shops and storage places to be licensed and to make daily or weekly reports to the police about cars sold, purchased, repaired or stored.

Law requiring owners to register at police headquarters in city or town in which he resides, or with the sheriff in places where there is no police department.

Law requiring the licensing of second hand dealers and reference from the police department before license is granted.

Law requiring the examination of car and all numbers on it before it is licensed or registered by authorities.

Federal or state law requiring an abstract of title and the recording of the document; also making it an offense to purchase a car the title to which is not clear.

Law requiring all operators to obtain and carry an identification card.

Law making it a felony to own or to transport from one state to another or to have possession of a car, the numbers on which have been defaced or changed.

Law compelling a seller at the time of sale to furnish to purchaser a complete set of part numbers.

Laws requiring the establishment of federal and state bureaus, in which are to be kept a record of all cars manufactured and licensed or registered; each state bureau to have license clerks in each county of the state to whom applicants for licenses must apply in person and take car for examination.

Law prohibiting persons buying second-hand cars until five days after the state license bureau has been notified of proposed sale.

Law requiring that all cars manufactured shall have all parts numbered in such a way as to make it more difficult than now to destroy the numbers.

Law requiring courts to punish convicted person with prison sentences only.

Laws requiring states to provide adequate funds for the return of accused persons for trial.

LAW requiring purchaser and seller to obtain signature of police chief or sheriff before vehicle can be registered and to submit car to chief or sheriff for inspection.

Law requiring garage owners and repair men to report to police any car, the numbers on which have been tampered with.

Law requiring the dealer's plates be issued only to reputable dealers.

Law authorizing police to seize and hold, pending an investigation, any car, the numbers of which have been tampered with.

Several police departments advocate that cities have ordinances licensing and regulating second hand dealers in automobiles and requiring them to make daily reports to the police on blanks provided by the city. (Report No. 434 of the bureau contains all ordinances effective in American cities); requiring owners to register with police assembly numbers and private marks on cars. The police also advocate that owners place private marks on their cars for identification purposes.

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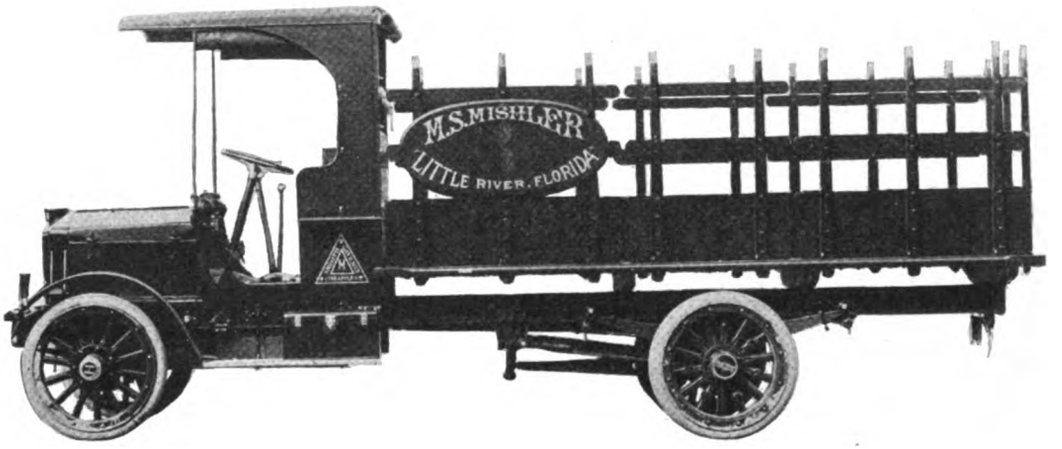
HURLBURT

MOTOR TRUCKS



First Hurlburt Truck built nearly eight years ago still in service.

QUANTITY DELIVERIES AVAILABLE

We have recently so greatly increased our equipment and facilities by taking over a large plant in Harrisburg, that we are making deliveries of Hurlburt Trucks in quantities and are giving real truck service.

The Hurlburt is essentially a high quality truck which makes good every promise. They have a record for continuous service. The first Hurlburt built nine years ago is still doing a full day's work.

The present Hurlburt Trucks are substantially of the same design as the first—a vindication of Hurlburt superiority.

"Consult Owners" is our slogan, proving that we are willing to let the truck speak for itself. The list of owners is a veritable blue book of New York City.

Some attractive territory is still available for those who write at once.

Four Models—1½-2, 2½-3, 3½-4, 5-5½ Tons

HURLBURT MOTORS, Inc.

8-10 E. 39th Street, N. Y. C.

Service Station, 133d St. and 3rd Ave., N. Y. C. **Factory: Harrisburg, Pa.**

HURLBURT

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Road and Street Development

Highway Improvement Throughout the United States Has Taken On New Life Until It Has Reached the Proportions of a National Movement

THE state of Kansas to date has financed 1,344 miles of improved highways, the estimated cost of which amounts to $48,859,395. The State Highway Commission has granted to the counties, Federal Aid on 468 miles of road at an estimated cost of $24,005,104. Federal Aid contracts have been awarded to December 1, for 143 miles of hard surfaced roads at a cost of $4,196,900. Kansas has completed during the 1919 season, 20 miles of this amount, leaving 123 miles of highways to be finished during the 1920 season. Of the number of miles of contracts awarded to date, 64 miles are concrete, 55 miles are brick, 19 miles are gravel, and five miles are macadam.

THE state of Missouri has laid out an extensive plan of road building for the next three years. The plan calls for the construction of 6,000 miles of roads. The legislature appropriated $3,200,000 to be spent during 1920. Counties and districts have voted $16,814,000 in road bonds. The roads to be built will probably be concrete, brick, macadam, gravel and graded earth roads.

MORE than $30,000,000 will be available for road and bridge work for the state of Iowa, according to an early estimate. Paving will amount to 355.85 miles; gravel surfacing will total 231 miles; earth road construction, 1,334 miles. This makes a total of 2,000 miles of construction on the primary or main road system, while 1,000 miles will be graveled on the county road system. Paving will be almost entirely of brick and concrete.

DURING 1919 nearly 90 miles of concrete roads were constructed and if labor conditions are favorable, about 2,000 miles will be built this year in Minnesota. Fifteen thousand miles of grading and gravel roads have been planned. Eighteen million dollars is now available for highway work. Minnesota is attempting to secure legislation which will permit the building of trunk lines, thereby adding much to the state highway system.

NEARLY $5,000,000 will be spent in the improvement of roads in South Dakota this year. There are 60 counties, and nearly every one of them will build roads, through the supervision of the State Highway Commission. Individual counties will spend $3,000,000 for roads, and $2,000,000 for bridge construction. Near the middle of February, bids will be asked for $1,000,000 worth of work. Bond issues are expected to be voted during the spring elections, and these will be used in most cases for hard-surfacing. Automobile license fees will be used for maintenance.

SINCE organizing in March of 1917, the State Highway Commission of North Dakota has accomplished considerable work. About 400 miles of earth and gravel roads have been contracted for, and by taking advantage of Federal Aid in the next three years, the commission expects to do $2,500,000 worth of work each year. There are 70,000 miles of public highways in the state, of which 5,000 miles are included in the state highway system. An attempt is being made to bring before the people of the state at the next general election, an amendment to the constitution, which will permit the issuance of $50,000,000 in highway bonds.

MONTANA plans to build approximately 50 miles of modern paving, 1,100 miles of compacted gravel or macadam type of surface, and 300 miles of earth road. The expenditure will amount to about $5,500,000 on main state highways and between $3,000,000 and $4,000,000on county highways. Federal Aid funds will be applied upon approximately $500,000 worth of paving projects within corporated cities or towns.

INDIANA expects to build approximately 135 miles of state highways, and the cost will total something near $5,000,000. Most of it will consist of cement concrete. Plans for 300 miles of additional work have been prepared, and a number of bridge structures also will be put up. Indiana derives its road funds from the automobile license fees, the inheritance tax, a direct levy and Federal Aid.

OHIO has surveys and plans in the process of completion for approximately 1,000 miles of road. With the sum of $25,000,000 available for the improvement of roads during 1920 the Highway Department expects to award contracts during the season for the improvement of 700 miles of roads.

MICHIGAN State Highway Department has available for 1920 $5,000,000 from a bond issue, $2,500,000 from a budget appropriation, and approximately $1,250,000 from Federal Aid appropriation. It is expected that 950 miles of State Aid roads will be built, and a considerable mileage in addition, will be constructed under state supervision.

ARKANSAS has let contracts for 2,600 miles at a cost of $40,000,000 and it is hoped that about 750 miles of this work will be completed in 1920.

TEXAS plans to complete 200 miles of Federal Aid projects in 95 counties. This will mean the building of approximately 2,144 miles of road at a cost of $21,600,000. Concrete will be used on 87 miles, bitumes on 262 miles, and gravel or macadam on 1,795 miles. During 1919 about $80,000,000 worth of county road bonds were voted, and $33,000,000 has been appropriated, all of which will mean an increase of about 20 per cent in county road building during 1920.

OKLAHOMA expects to expend between $5,000,000 to $8,000,000 on highways this year. Half of two hundred miles to be built will be surfaced with local gravel, the remainder will be concrete, brick and macadam.

COLORADO has outlined a road building plan that calls for the improvement of 800 miles of improvement, for the year for 1920. Approximately 50 miles will be hard surfaced pavement, the balance being graded, and surfaced with gravel or crushed stone. The total expenditure for this work will be about $4,500,000. A bond issue of $5,000,000 to aid the state in meeting Federal Aid will come before the voters of the state in November 1920.

WYOMING will spend about $3,000,000 for highway improvement. Forty miles will be hard surfaced, and 1,000 miles of natural materials. Natural deposits will supply nearly all the necessary surfacing materials.

How to Get Tax-Free Body

ST. LOUIS, Mo., March 22.—Considerable clarity has been given to sections of the revenue law dealing with the tax on motor trucks by the publication by the Treasury Department of new rulings amending Articles 11 to 16, inclusive, of Regulations 47, amended during 1919. Copies of these amendments have been furnished the National Automobile Dealers' Association by the Treasury Department and have been distributed to the N. A. D. A. members in a special bulletin. Because of numerous requests to the N. A. D. A. for information as to how a dealer may obtain a body tax-free when it is to be added to a motor truck chassis the N. A. D. A. has had the certificate printed upon a sample invoice which will be sent to any dealer upon request.

Dealer Gets Machine

ST. LOUIS, Mo., March 19.—A dealer's chattel mortgage has precedence in South Carolina over a repairman's lien for work and materials according to a decision handed down by the South Carolina Supreme Court in the case of the R. H. Nesbit Auto Company, versus Whitlock (103 S. E. 22), decided January 26, 1920.

The case was before the Supreme Court for interpretation of a section of the Acts of 1912, p. 624. The machine was sold for part cash, the credit being protected by notes. The purchaser took the machine to the repair shop. Neither the notes nor the repair bill were paid. The mortgage demanded possession but the repairman refused, contending that the statute gave him precedence over the mortgage. The Supreme Court decided the dealer was entitled to the car.

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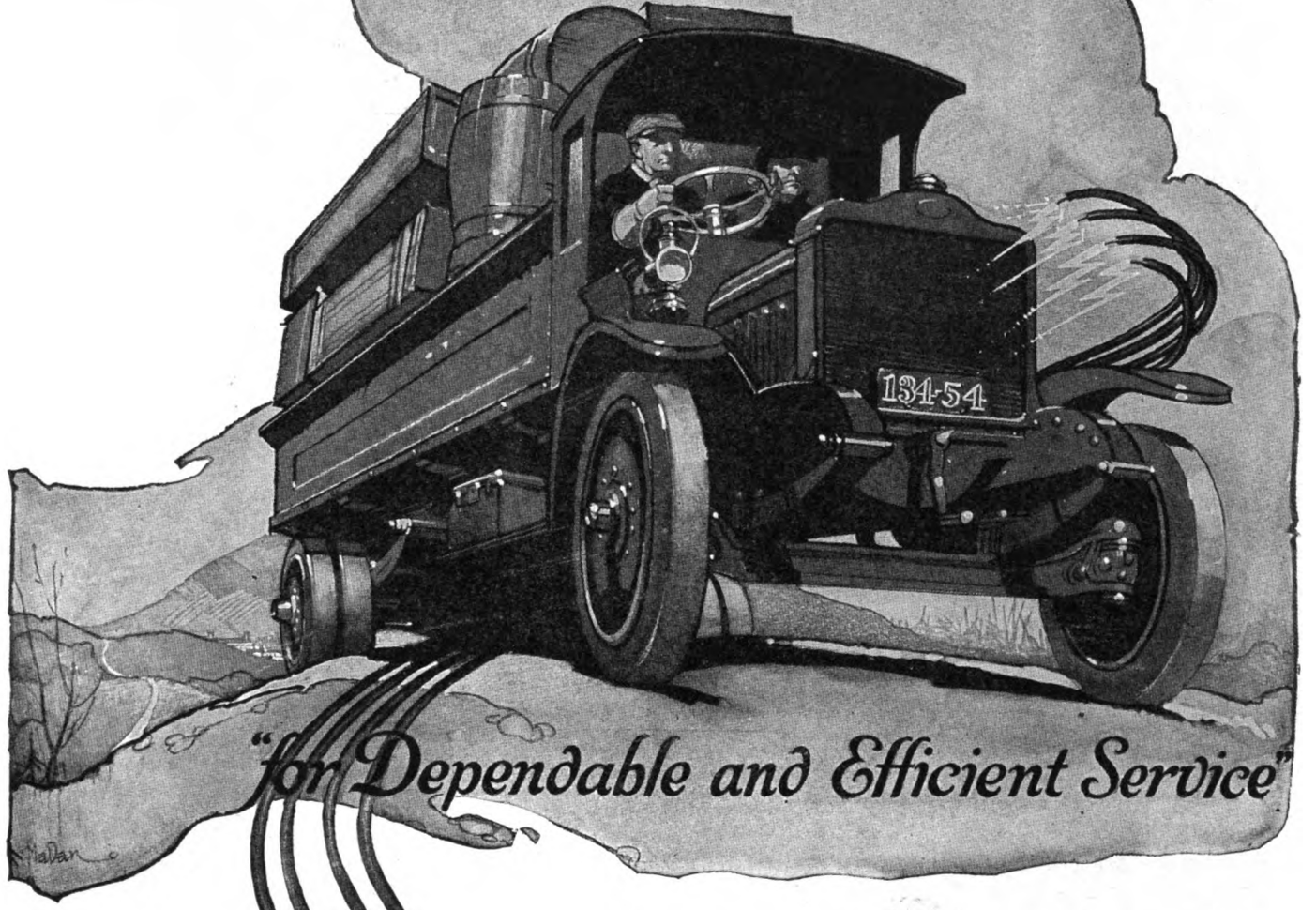
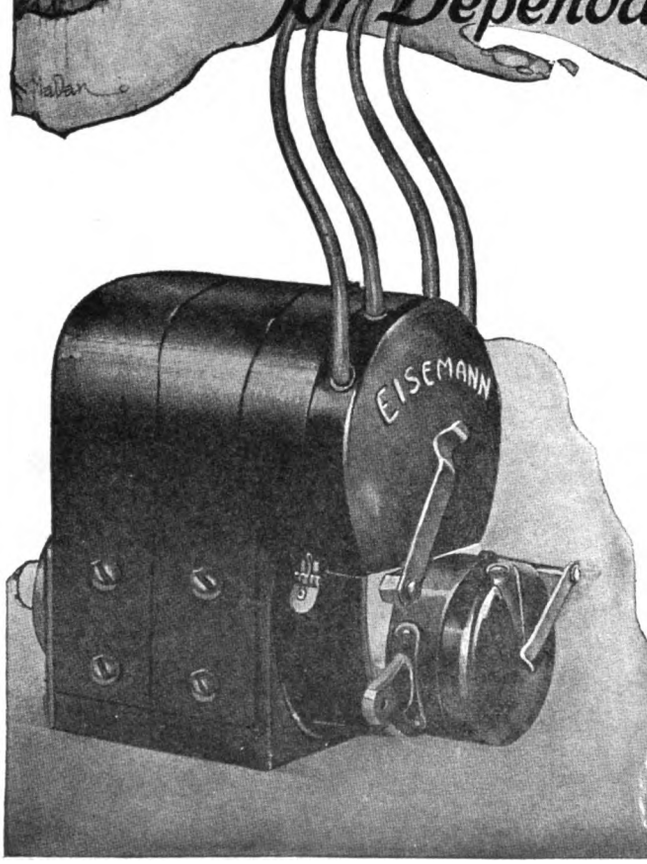
EISEMANN
MAGNETO



"for Dependable and Efficient Service"



Out of the valley and to the top of the hill—forging ahead through sand and mud to "get there" with a heavily loaded truck—your ignition must be absolutely dependable. The reputation and performance of the Eisemann is unrivalled and is attested to by the fact that the vast majority of Motor Truck Manufacturers use the Eisemann Magneto as standard equipment.

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MAGNETO CORPORATION

Plant and General Offices—32 Thirty-Third St. Brooklyn, N.Y.
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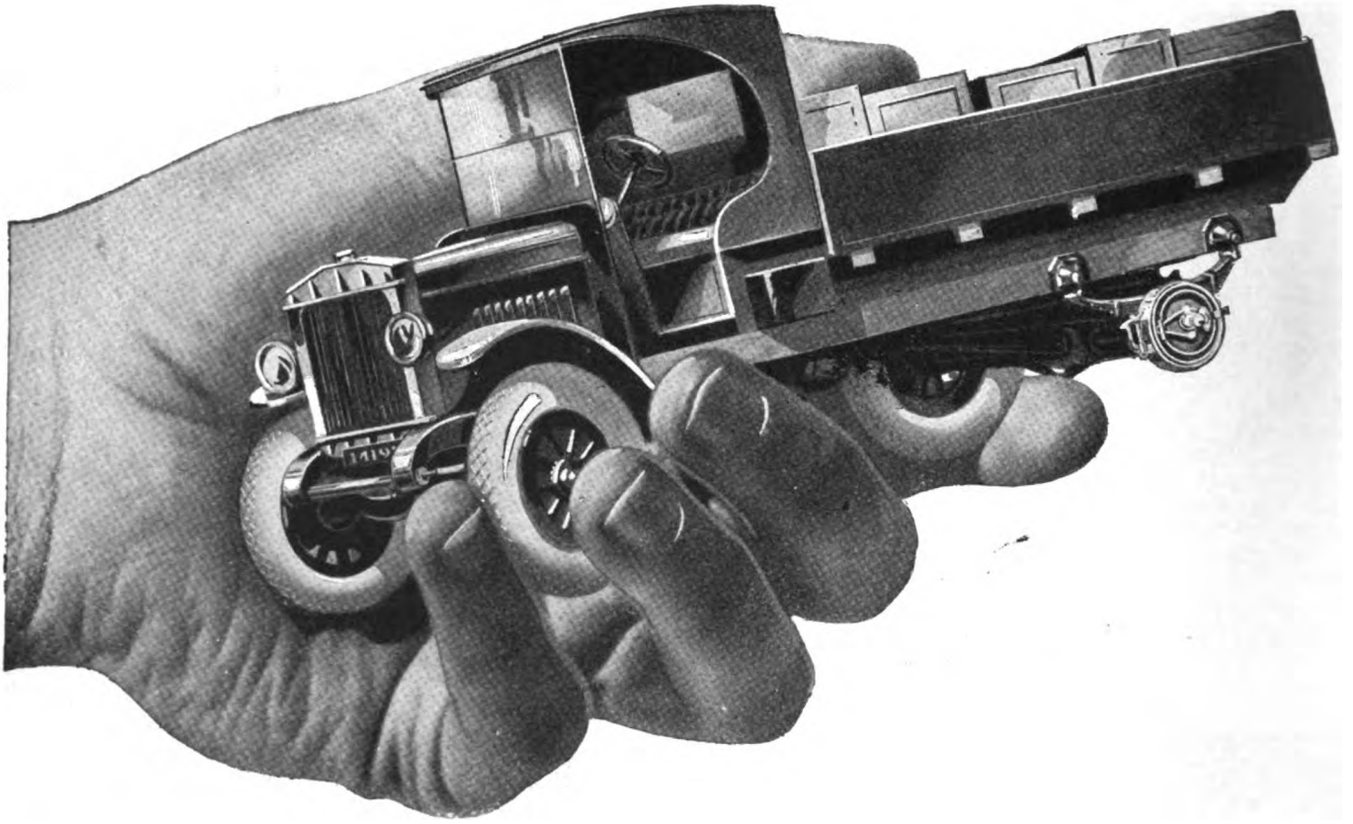

What are their brake

SAFETY, Service, Economy for your customers and greater profits for you, all depend on the right answer to this question – What are their brake bands lined with?

Too many people wait until brakes refuse to hold before they give any consideration to this question.

Here's where you can make friends and extra profits. Speak the friendly word of warning before slipping brakes result in costly accidents. Tell truck owners that their brakes need re-lining with Johns-Manville Non-Burn Asbestos Brake Lining;—the lining that lasts longest and holds best, because it is made of the best asbestos, because it's

Through—

Asbestos

and its allied products

JOHNS-MANVILLE
Serves in Conservation

Heat Insulations, High Temperature Cements, Asbestos Roofings, Packings, Brake Linings, Fire Prevention Products

JOHNS-AUTOMOTIVE

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bands lined with?

a Johns-Manville product from mine to brake drum.

Turn your eyes in the direction of this truck or commercial car brake replacement business. You will be surprised how much of it there is and how well it pays when backed by such a dependable product as Johns-Manville Non-Burn Asbestos Brake Lining.

Use Johns-Manville Non-Burn Asbestos **Brake Lining for all brake renewals.**

H. W. JOHNS-MANVILLE CO.
New York City
10 Factories—Branches in 63 Large Cities
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To the trade:— Our jobber-dealer sales policy assures you real trade protection. Write for details.

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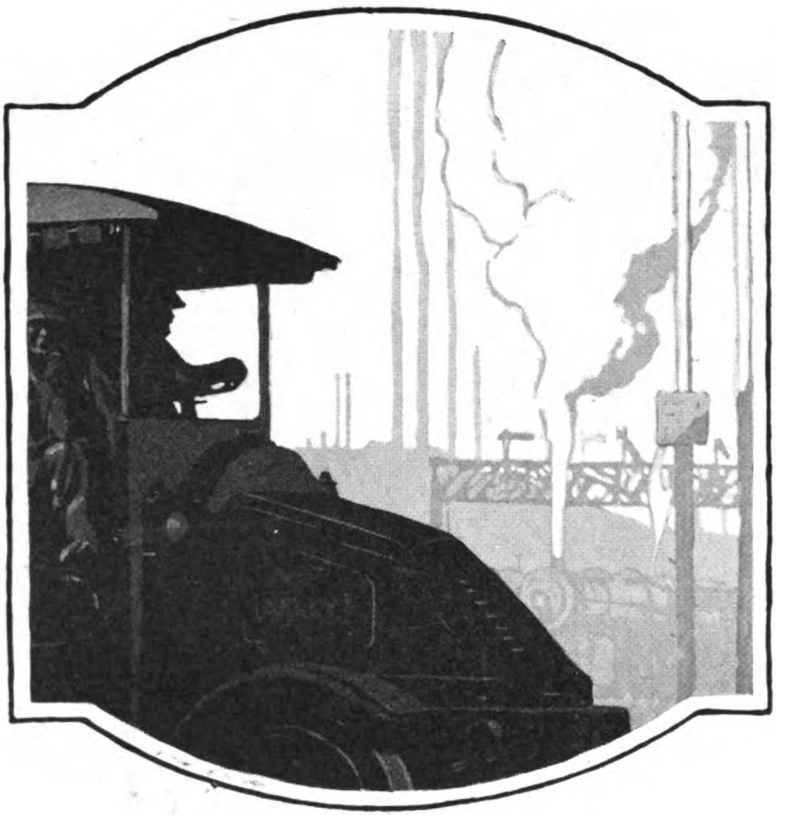

"The Big Brother to the Railroads"

Covert Equipped

Covert Transmissions are standard equipment on Kelly-Springfield Trucks.

It is with no slender measure of pride that we make this statement.

Kelly-Springfield has used Covert Transmissions exclusively for twelve years, during which time this truck has earned the title, "The Big Brother to the Railroads."

COVERT GEAR COMPANY, INC.

Sales and Engineering: 967 Woodward Avenue, Detroit, Michigan
Factory: Lockport, N. Y. *Export Office:* 100 Broad Street, New York

"There is no Weak Point in a Covert"

COVERT TRANSMISSIONS

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A Maxwell truck hauls 1½ tons—and 75% of all loads carried by horse or motor are 1½ tons or less.

Please mention "Power Wagon" when writing to advertisers.

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The Brake Connections

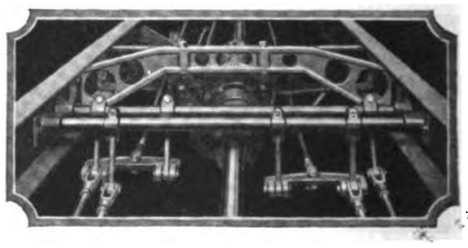
Available running and emergency brakes operate through parallel systems, each comprising three levers, a shaft extending across the frame, an equalizer and two brake rods.

The shafts are supported at the ends by heavy bearings and equalizers are swung from pendant levers.

Heavy yokes distribute the braking power evenly to both wheels, thereby preventing skidding, the compactness of the equalizing yokes being a distinctive Available advantage. They transmit the pull of the rods to one wheel direct and to the other through the shaft and clamped levers.

The entire assembly responds freely to the pull of the rods, its safety and perfect functioning being largely responsible for the good repute of Available trucks among those who know and use them.

Feature No. 5



Our new 40-page Art Catalog describes all Available models and sets forth their advantages at length. Write Department M.

Standard Capacities 1½ to 7 Tons

AVAILABLE TRUCK COMPANY

General Offices and Factory:

North and Kilpatrick Avenues, Chicago, Ill.

AVAILABLE ALWAYS SINCE NINETEEN TEN

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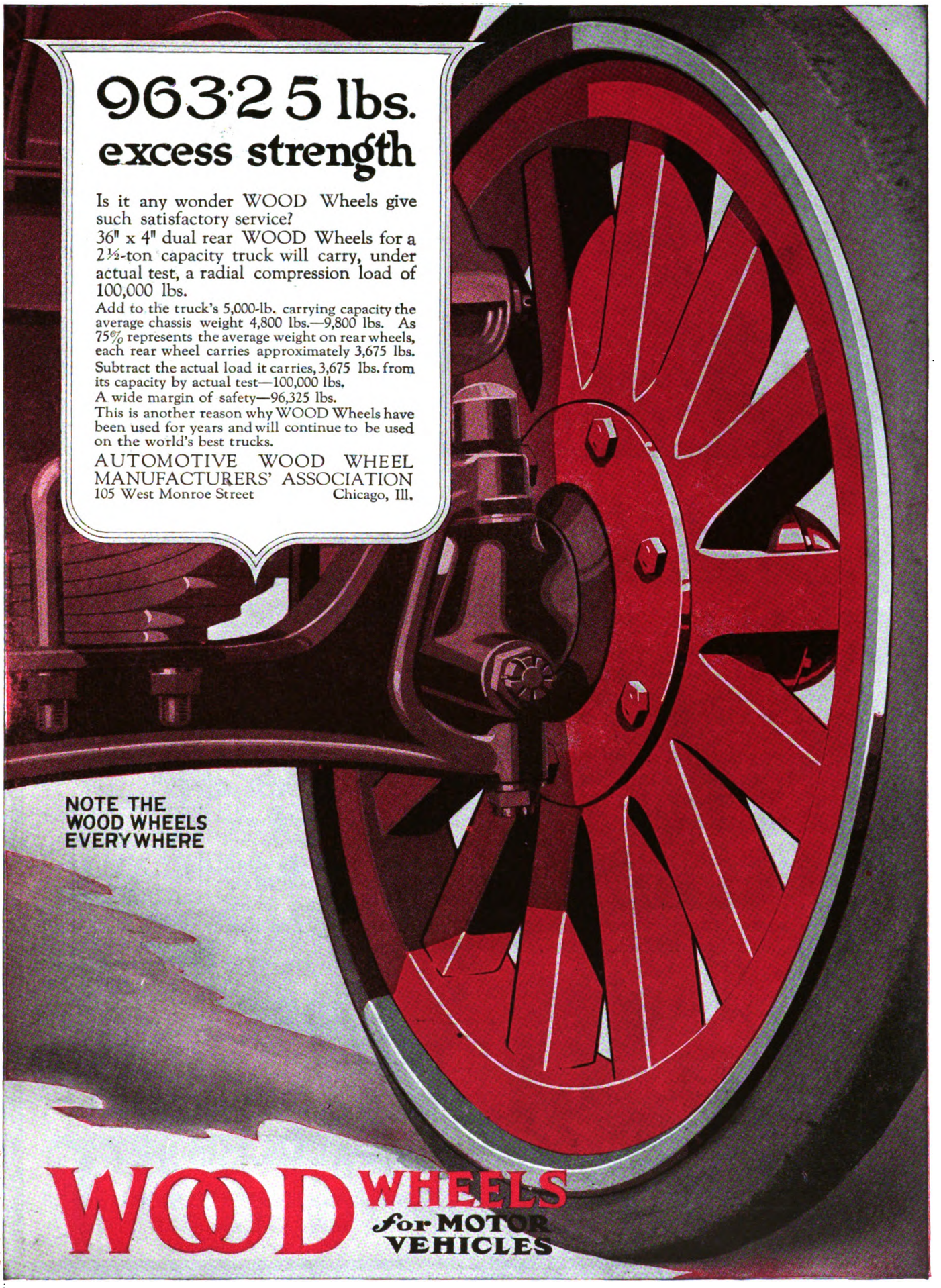

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Big Users Place Their Stamp of Approval on Selden Trucks

Big truck users operate SELDEN Trucks. Concerns like the STANDARD OIL COMPANY, SEARS, ROEBUCK & CO., GILLETTE SAFETY RAZOR COMPANY, GOODYEAR TIRE & RUBBER CO., KNABE PIANO COMPANY, COCA COLA COMPANY and FIRESTONE TIRE & RUBBER CO.

The fact that concerns as large as these issue repeat orders for SELDEN Trucks is conclusive evidence of their merit. For motor trucks are tested to the utmost by such concerns before repeat orders are issued. Rigid cost accounts must prove them to be productive, profitable machinery.

Selden Distributors, the world over, are profiting by sales and repeat sales of Selden Trucks—with little effort on their part—for Selden "In-built Quality" sells itself.

Some territory, though very little, is still open to aggressive, well organized dealers. If you would like to become a Selden dealer, we should be glad to hear from you.

The Magazine "TRUCK TRANSPORTATION" will be sent free to all interested. Write Dept. PW
SELDEN TRUCK CORPORATION
Rochester, N. Y.

Ship by Truck—SELDEN Truck
1½, 2½, 3½, 5 Ton Models—All WORM Drive

IN-BUILT QUALITY SELDEN MOTOR TRUCKS

Selden Motor Trucks

SELDEN TRUCK CORPORATION, Rochester, N. Y., U. S. A.

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Hauling 14,630 Pounds

The above photograph shows a 3½-ton truck and a 2¾-ton WARNER TRAILER hauling a 14,630 pound load. The distance was 56 miles over rough, rutted roads. The round trip for the truck and trailer was made in twelve hours.

This is only one of the instances of the way WARNER TRAILERS are solving the hauling problems and reducing hauling costs. In addition WARNER TRAILERS lower maintenance costs, reduce labor and speed up delivery. Many concerns have been able to save the purchase cost of additional trucks because WARNER TRAILERS in some size and shape multiply the efficiency of trucks already in service and do more work with less labor and at a lower cost.

Each WARNER TRAILER is scientifically built. Just as much care is taken as in building a high grade motor truck. In many respects the Warner Heavy Duty Truck Trailer is a truck chassis minus the power plant.

WARNER TRAILERS are solving hauling problems for firms in widely different lines of business. Let us show you how it will do the same thing for you. The advice of our Engineering Department is gratis.

WARNER MANUFACTURING COMPANY
26 Main Street, Beloit, Wis.

WARNER

HEAVY DUTY TRUCK TRAILERS

TWO AND FOUR WHEEL TYPES

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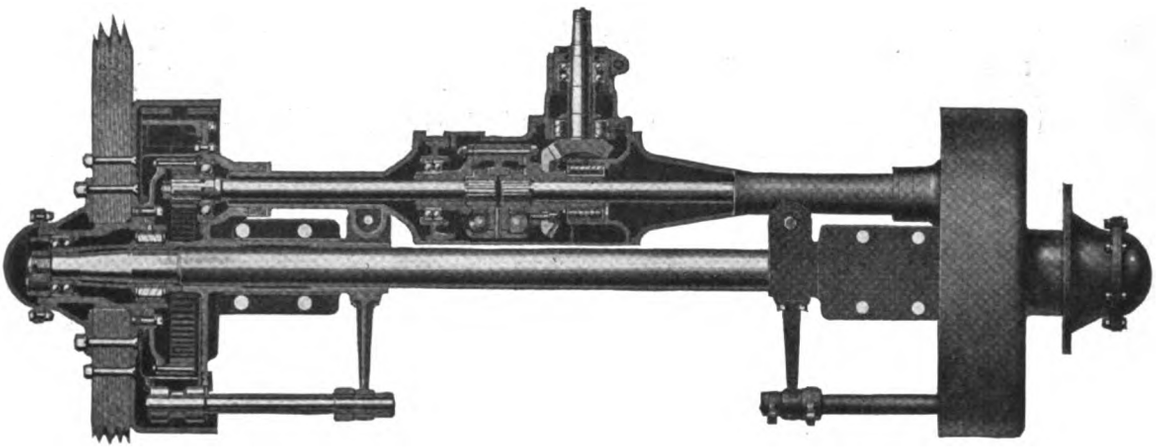
KENNEDY AXLES

MAKE GOOD TRUCKS BETTER



Torque Absorption Feature

Kennedy Axles, by means of heavy coiled springs, protect every vital part of the truck from shocks due to changes in torque, thus *decreasing the cost* of wear and tear on engine, differential and tires, and *increasing the life* of the truck.

1-ton 1½ ton 2½ ton 3½ ton

The Hero Manufacturing Company

2347-67 Westmoreland Street

PHILADELPHIA, PA., U. S. A.

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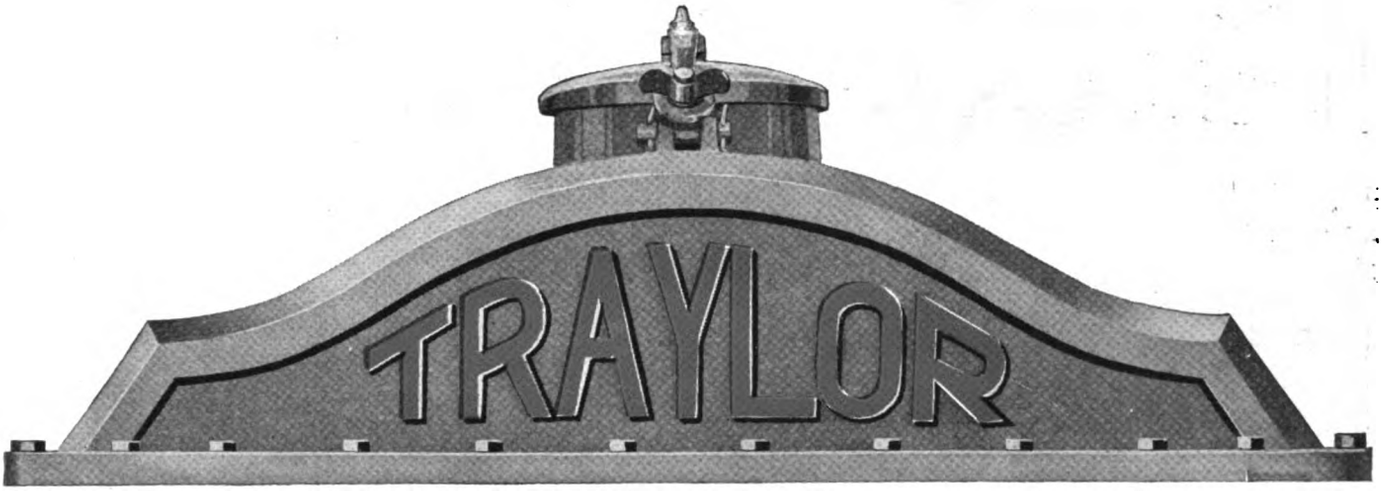


Making Truck History

THE Traylor truck is repeating the history of all great truck successes.

Fundamentally correct: In sizes, construction and specifications.

Backed by unlimited resources: Materials, facilities for manufacture, organization and experience.

Merchandised properly: The rights of distributors and dealers protected by exclusive territory contracts—affording an ample margin for profit.

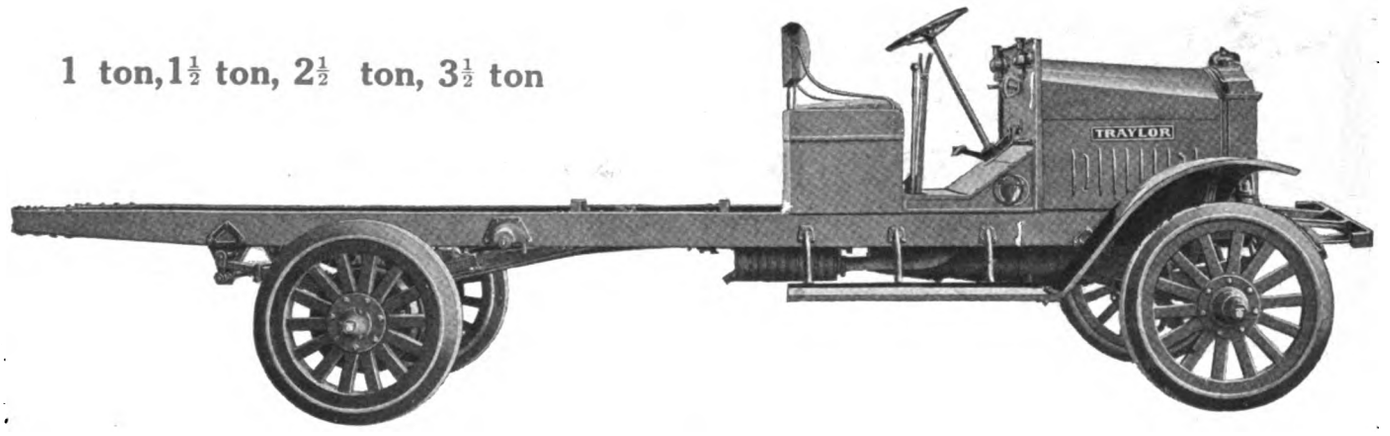
Advertised lavishly: Colored inserts and spreads, dealer and consumer magazines, farm journals, newspapers, direct mail literature and "dealer helps" of all kinds.

The Traylor franchise is **open today** to a limited number of really progressive dealers—**Tomorrow** it may have the value of a public service grant and be unobtainable on any terms.

Traylor Engineering & Manufacturing Co.

Truck and Tractor Division **CORNWELLS, PA.**

1 ton, 1½ ton, 2½ ton, 3½ ton



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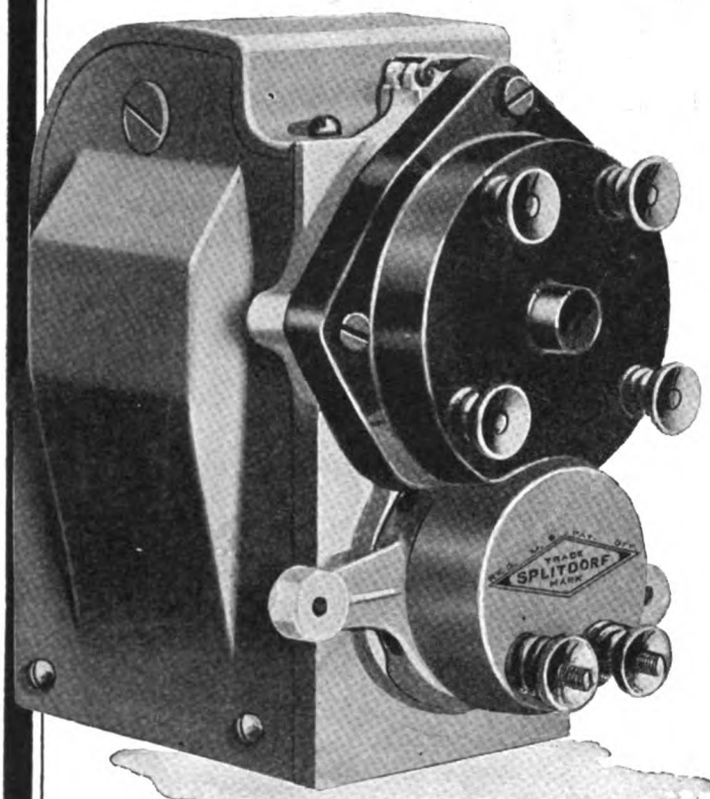
GOOD COMPANY



Run your eye down the list of trucks which have established for themselves wonderful records of efficiency. Note their specifications. Check up on the good company they keep.

Invariably you will find under the heading "Ignition" the word SPLITDORF.

The "Grant Truck" is one of them.

Trucks of the character using the Splitdorf Magneto revolutionized transportation because they always delivered that which the business man expected to buy—dependable service—and Splitdorf ignition helped to carry them along to success.

SPLITDORF ELECTRICAL CO.
NEWARK, N. J.

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United States Motor Trucks

FLOATING POWER PLANT

"As Good As The Name"

Springtime is a Good Time to Sell United States Farm Trucks

Spring Farm Hauling Problems Perplexing

Farmers plowing and planting. Every horse and man needed in the field. Produce must be marketed — milk delivered — stock hauled to market — materials for new buildings, fencing and fertilizer brought from town — numerous odd hauling jobs need immediate attention.

United States Farm Trucks—The Solution

One and one-half ton capacity — just right for farm use. Five-way convertible body — easily and quickly changed by one man to meet any hauling need.

Standard wagon tread, plenty of road clearance, 144 inch wheel base — gets in and out of tight places with ease. "Floating Power Plant" enables it to run as well in fields as on best roads. Strains, jolts, twists, do not stall the motor, bind the bearings or lessen the power.

DEALERS—Get your share of Farm Truck Business

If you are already handling trucks but are dis-satisfied, get the U. S. proposition. It's the most attractive.

If you are not selling trucks *you will be*. You cannot get away from it. So get lined up with the right truck for your territory. These trucks will sell fast.

The U. S. is a full line — with special attention paid to farm hauling. The farm market for trucks is tremendous.

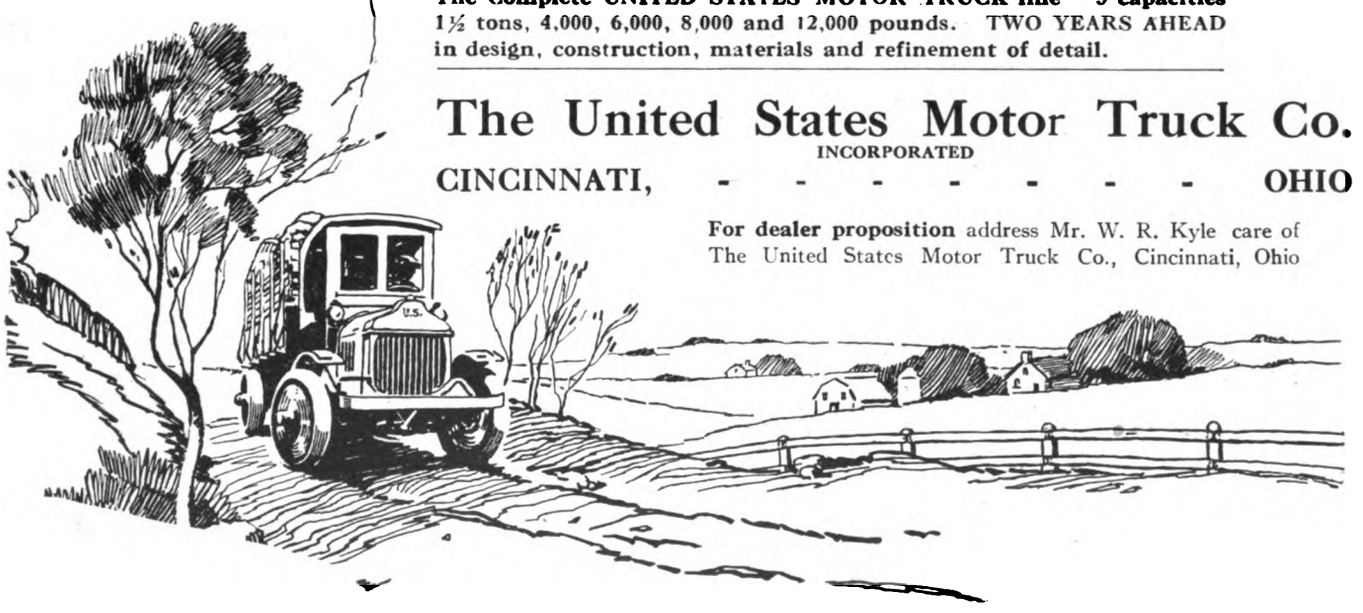
The Complete UNITED STATES MOTOR TRUCK line — 5 capacities 1½ tons, 4,000, 6,000, 8,000 and 12,000 pounds. TWO YEARS AHEAD in design, construction, materials and refinement of detail.

The United States Motor Truck Co.

INCORPORATED

CINCINNATI, - - - - - - - - OHIO

For dealer proposition address Mr. W. R. Kyle care of The United States Motor Truck Co., Cincinnati, Ohio



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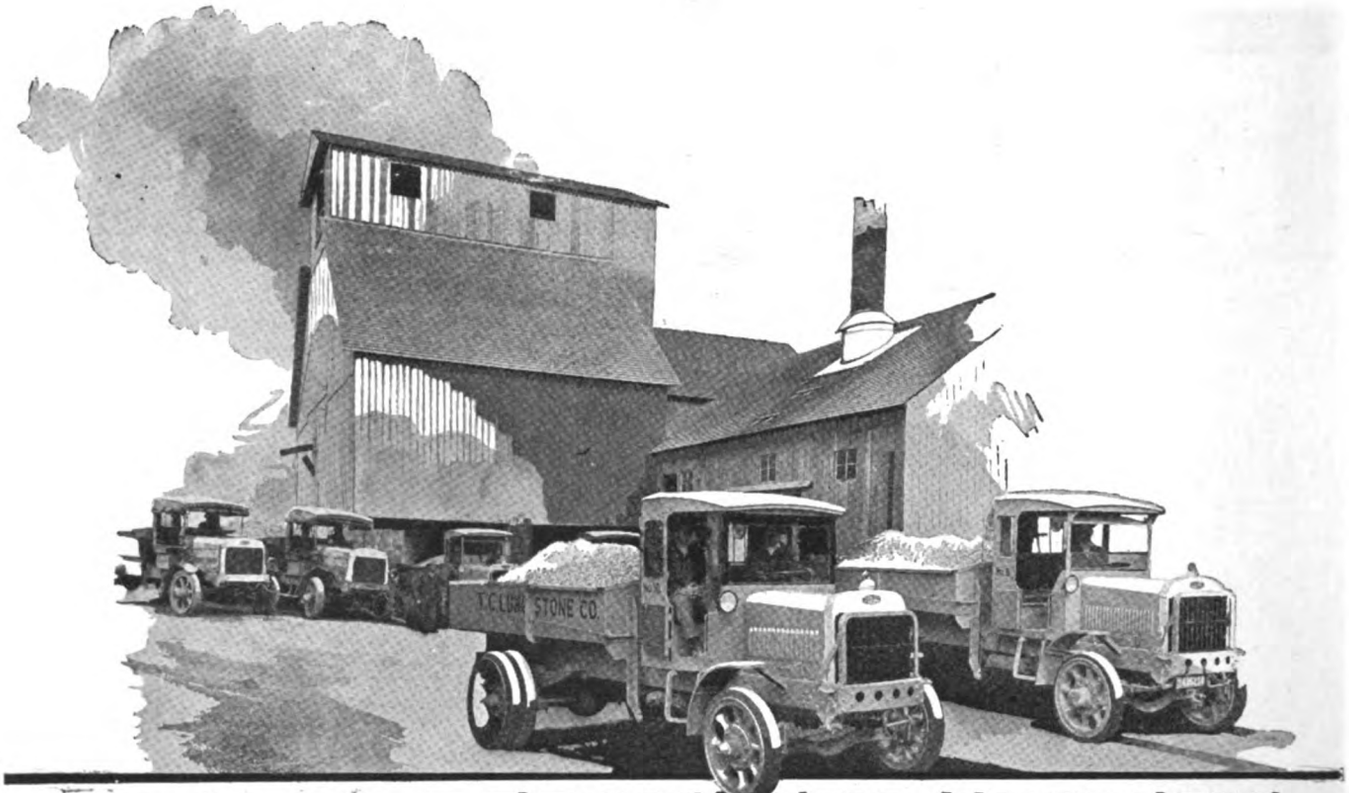

GRAMM-BERNSTEIN TRUCKS

Its Good Name Is a Powerful Sales Help

At the outset the Gramm-Bernstein dealer starts with a very distinct and definite advantage.

Competition or comparison actually do not enter into the sale of Gramm-Bernstein Trucks.

The Gramm-Bernstein dealer does not have to waste time in contrasting the respective merits of the different prices of standard units.

Back of the dealer's effort is B. A. Gramm's twenty years of truck manufacturing and engineering invention.

This experience is a vital element that literally lifts the Gramm-Bernstein Truck above and beyond competition.

It had its source in the days when the present tremendous market for motor transportation was a vision, not an actuality.

It embraces years of record that admit of nothing but goodness, always keeping well ahead of the requirements of business.

It includes a long history of high service and low costs—of long life and ultimate economy.

The dealer relies on basic superiorities that have long established preference for the Gramm-Bernstein line.

He can show that many of the Gramm-Bernstein exclusive advantages, such as the patented, constant-mesh transmission, justify in themselves this decided preference.

And he establishes the constancy of this preference by an amazingly high percentage of repeat orders.

It will not take you long to find out for yourself why so many dealers of the better class are demanding more and more Gramm-Bernstein Trucks.

All we ask is the opportunity to lay before you the complete story. Gramm-Bernstein Worm-Drive Trucks, in 1½, 2, 2½, 3½ and 5-ton capacities, are now sold completely equipped, ready for the body—not an extra to buy—although others charge up to and over $500.00 for the equipment we include in our price.

All Gramm-Bernstein Transmissions are provided with a pad for attaching Gramm's Basic Patent Power Take-off. Dealers and truck owners should assure themselves that any trucks purchased with power take-off do not infringe B. A. Gramm's Basic Patent No. 1194994.

GRAMM PIONEER BERNSTEIN

The T. C. Long Stone Company, at its quarries near Lima, Ohio, operates six five-ton Gramm-Bernstein Trucks. During busy seasons, the trucks are kept going 24 hours a day. The company states that they are so dependable it can almost be said that they never need repairs. Two Gramm-Bernstein five-ton trucks were added to the Long fleet last fall.

Ship by Truck

The Gramm-Bernstein Motor Truck Co.

Pioneers Since 1901—Builders of the First Liberty (U. S. A.) Truck

LIMA, OHIO, U. S. A.

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BOSCH

The Years Behind Bosch

Through nearly half a century of dependable performance, Bosch Magnetos have established an unparalleled service record among three million owners.

And through all these prestige building years has grown the Bosch Service organization—a wonderfully efficient nation-wide, world-wide chain of Bosch Service Stations.

Bosch Service—Bosch Prestige, backed by an enormous national advertising campaign and the closest kind of sales co-operation with dealers, is making prospective purchasers of the truck you sell, if you can say, "with Bosch High Tension Magneto Ignition."

Your trucks can come through from the factory Bosch Equipt if you insist on getting it.

Be Satisfied ***Specify Bosch***

AMERICAN BOSCH MAGNETO CORPORATION

Main Office and Works: **Springfield, Mass.**

Branches: **New York — Chicago — Detroit — San Francisco**

300 Service Stations in 300 Centers

AMERICA'S SUPREME IGNITION SYSTEM

MOTOR TRUCKS - TRACTORS - AIRPLANES - MOTOR CARS - MOTOR BOATS - MOTORCYCLES - GAS ENGINES - ETC.

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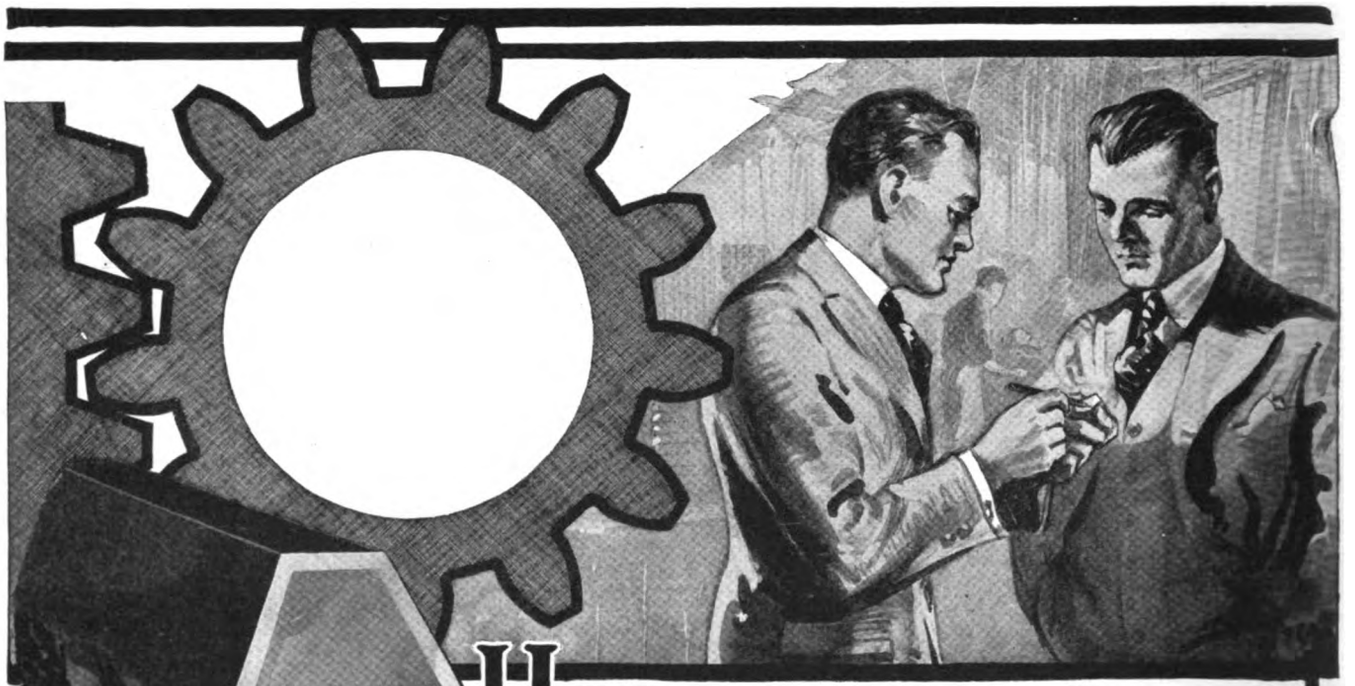

Hard for Wear and Tough for Strength

BROWN-LIPE CHAPIN DIFFERENTIALS

A certain percentage of gears, selected at random, are broken as a check on the heat treatment. They must show a hardened, (but not brittle) surface layer of sufficient thickness to withstand continuous wear. This must be supported by a homogenous base of solid, tough steel to absorb shocks and stresses.

A satisfactory "Break" is not accepted as conclusive evidence, but is merely one of a long series of inspections, checks and re-inspections. Those gears that successfully pass all these tests are worthy of representing these organizations.

BROWN-LIPE-CHAPIN CO
DIFFERENTIALS

BROWN-LIPE GEAR CO.
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Both at SYRACUSE, N. Y.

BROWN-LIPE GEAR TRANSMISSIONS

No. 10 of 40 Reasons for Superiority

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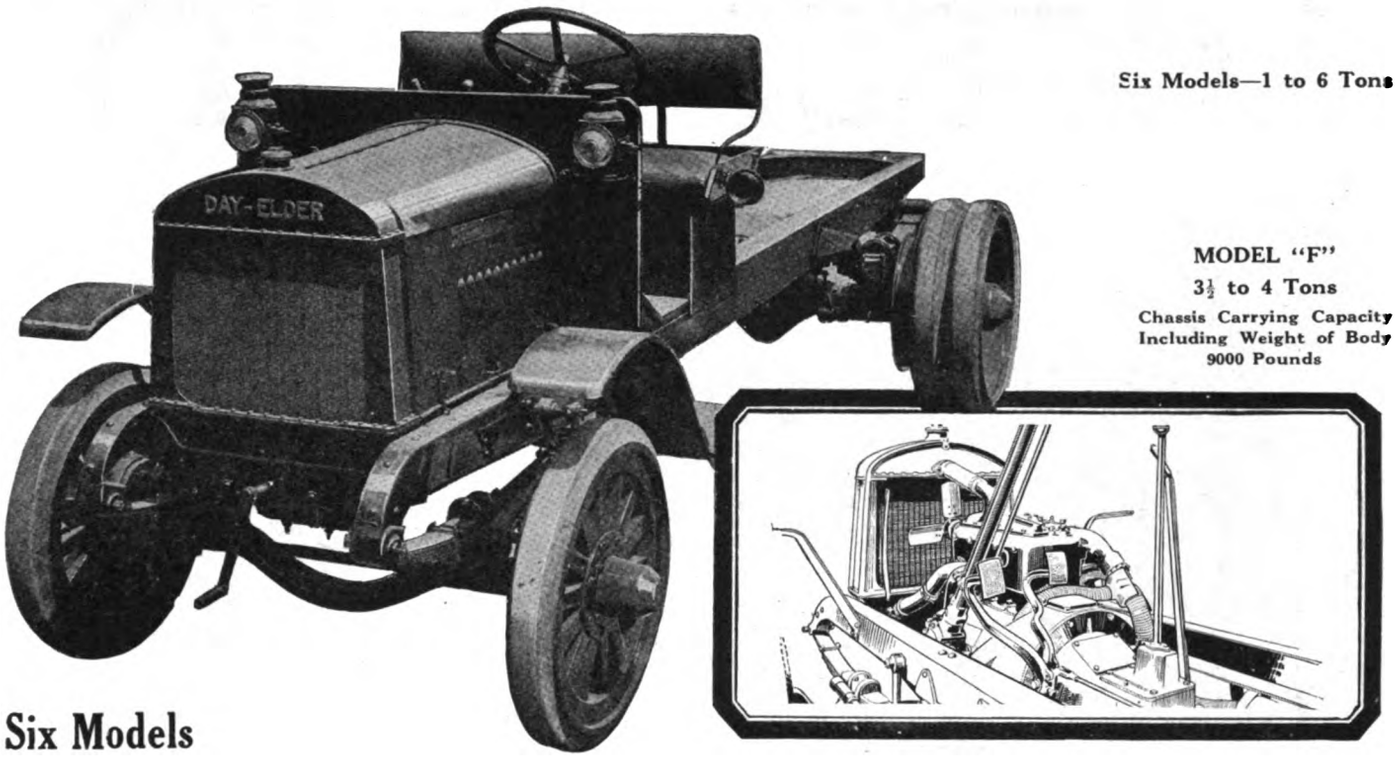

Six Models—1 to 6 Tons

MODEL "F"
3½ to 4 Tons
Chassis Carrying Capacity
Including Weight of Body
9000 Pounds

Six Models

Model A
1-1½ tons
Capacity Including
Weight of Body
3500 Pounds
$1995

Model B
1½-2 tons
Capacity Including
Weight of Body
4500 Pounds
$2300

Model D
2-2½ tons
Capacity Including
Weight of Body
6000 Pounds
$2750

Model C
2½-3 tons
Capacity Including
Weight of Body
7000 Pounds
$2950

Model F
3½-4 tons
Capacity Including
Weight of Body
9000 Pounds
$3700

Model E
5-6 tons
Capacity Including
Weight of Body
14,000 Pounds
$4600

Noted For Its Sturdy Dependability

DAY-ELDER quality and value are dependable because they are constant. Each finished part must meet the high standard of construction and workmanship that is set for it. This is why DAY-ELDER motor trucks are so widely esteemed for their dependable durability.

In choosing a motor truck, the buyer can safely waive, individually, this feature and that one, this new departure or that time-tried device. The final, deciding criterion is the consistent, dependable quality of all parts, reflected in a **performance** that meets all requirements. This alone reveals the aggregate worth of all features, design, construction and materials combined.

You as a dealer are interested in identically the same qualities in a truck as your customer, **plus** a real, two-fisted opportunity that will stand all the development you are capable of giving it. The DAY-ELDER franchise affords you this and the assurance that your customer will still be your friend for years after he signs the order. A post card will bring you our latest literature. Send for it.

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Worm-Drive Motor Trucks

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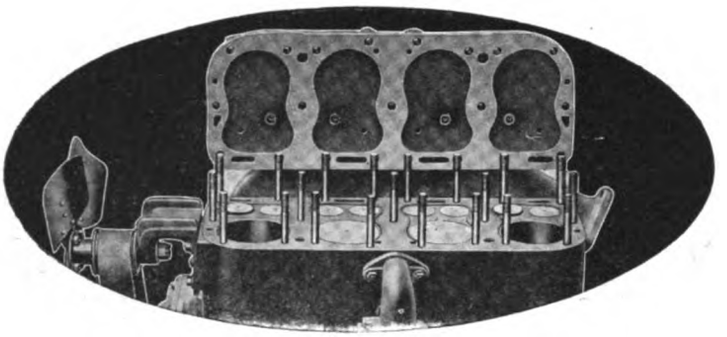
ACCESSIBILITY

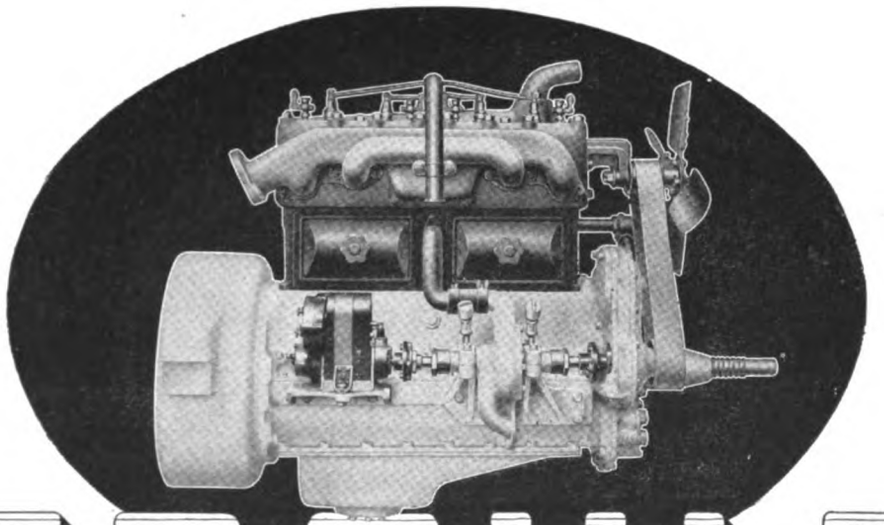


A Primary Essential in Design

The ready accessibility of every important part is only one more illustration of the forethought of Hercules designers.

The Hercules Motor Mfg. Co.
CANTON, OHIO

Sales Offices: Detroit Chicago Buffalo
San Francisco London, England



HERCULES

FOR TRUCKS AND TRACTORS

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"Wolverine"
The Truck of Good Service

Increased Capacity Enables Us to Contract with Eleven More Dealers

If you are in the business or are looking for a truck — examine the **Wolverine.**

As a truck, the **Wolverine** will stand comparison with the best—as you now know the best—that is made anywhere today. We have no apologies to make for it.

As a selling proposition you can find none better anywhere than we have to offer you.

Lastly, we assure you that we are able to deliver promptly all trucks called for by our dealers and guarantee you the same service.

Detroit, Mich., Nov. 15, 1919.

AMERICAN COMMERCIAL CAR CO.,
Detroit, Michigan

Gentlemen:—Your recent inquiry as to how we like the Wolverine Truck, should have received its answer from the fact that we purchased two of them this year. We surely would not have acquired the second if the first had failed to stand the gaff.

However, for your benefit, we will carry a little coal to Newcastle by stating that our two Wolverines are certainly holding up their end in demonstrating the three virtues that make a truck an invaluable aid in holding down existing high operative costs—efficiency, economy and dependency. In the expressive vernacular of the street, the Wolverine is unquestionably a peach.

CHAMPION BEVERAGE COMPANY,
F. Schmidt, Pres.

Write now for prices, discounts and any other information you want. Trucks are scarce and becoming more so.

American Commercial Car Co.
DETROIT, MICHIGAN

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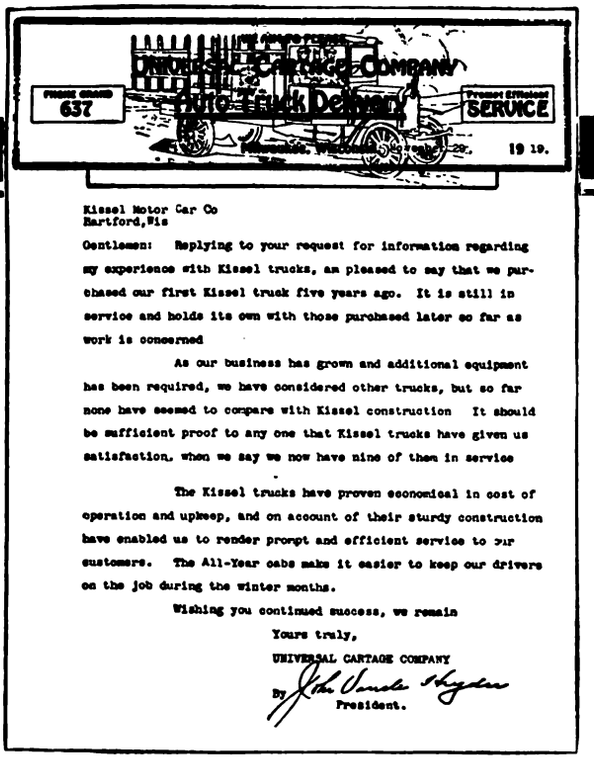


"Started business with one Kissel Truck—we now have nine Kissels and will buy more"

SEVERAL years ago the Universal Cartage Co. started business in Milwaukee, Wis., with one Kissel "Freighter" and several trucks of other makes. "Before standardizing our equipment by adding more Kissels," said John Vander Heyden, the President, "we had to contend with varied loading and operating conditions—enlarged floor space and extra help to handle the parts from different factories. Our mechanics had many adjustments and repairs; each had to be handled differently on account of different construction".

"Since disposing of other makes, we have reduced our stock of parts over one-half, easily taken care of by less than one half the help, and have reduced the gasoline consumption from ten gallons to five gallons per truck per ten hour day, thus effecting a weekly saving of 270 gallons of gas. Our drivers find it much easier to work for a concern that standardizes on equipment because they are then capable of driving and handling any one of our models.

"Our service mechanics can do more on Kissels because they are not complicated and being thoroughly familiar with every part can instantly locate any trouble and eliminate a great deal of lost motion in remedying it. As our older trucks wear out, the interchangeability of parts permits our using the unworn parts, such as wheels, frame, bearings, etc. Through a period of years this effects quite a saving."

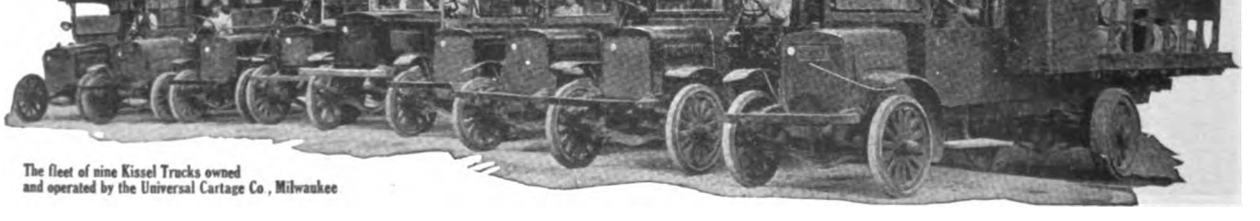
A summary of results the Universal Cartage Company has secured by standardizing their truck equipment with Kissel Trucks, brings out the following facts:

1. Increases driver's efficiency and creates a desire on his part to handle his truck 100 per cent. Attracts good drivers and keeps them satisfied.
2. Mechanics and service men can concentrate on one type of construction, quickly becoming familiar with all mechanical features—eliminating delays in adjusting and repairs—saving time in changing equipment.
3. Through interchangeability of parts, it permits a complete stock at small investment, reducing overhead and labor expense.
4. Enables owners to keep accurate check on gasoline, oil' tires and depreciation.
5. Lower upkeep and repair expense per truck per week results where entire organization is thoroughly familiar with one make.
6. A yearly labor saving of from 10% to 40% that otherwise would be spent in divided efforts.
7. Another important advantage is that the Kissel engineers in designing the Kissel-built motor and other units, standardized them as far as engineering principles and different sized models permitted.
8. The ALL-YEAR Cab, an exclusive truck feature, insures to Kissel fleet owners uninterrupted transportation the year around—giving full protection to drivers and increased results to owners.

The success of Kissel Trucks among the country's prominent fleet owners warrants your careful investigation.

Your nearest Kissel dealer is fully prepared to take the witness stand and submit to your cross examination. Or your request directed to the factory will bring latest literature, specifications and data.

KISSEL MOTOR CAR COMPANY
HARTFORD WISCONSIN



The fleet of nine Kissel Trucks owned and operated by the Universal Cartage Co., Milwaukee

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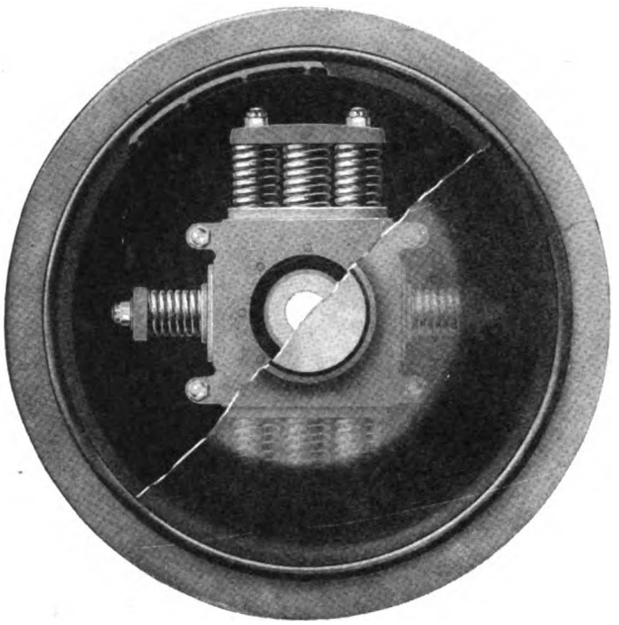
The Cornfield Resilient Wheel

Pneumatic Results—*And More*—With Solid Tires

Increase Your Light Truck Efficiency



Springs always remain in this position. They do not revolve with wheel. This insures constant even suspension of load and the elimination of vibration. The Cornfield Wheel is practically indestructible.

Increased costs of truck operation make it worth while to look carefully into the equipment of your trucks, and improve their efficiency if possible.

Cornfield Resilient Wheels—

Will Cut Gasoline Cost by cutting down the resistance to the motor, and increase the mileage.

Will Decrease Tire Cost by stopping the disintegrating pound on the tires and thereby increasing their mileage.

Will Prevent Vibration by preventing the effects of road shocks reaching and damaging the motor.

Will Increase the Life of Your Truck.

Cornfield Resilient Wheels Are Now Made in Full Sets for Ford One-Ton Truck and Other Light Trucks

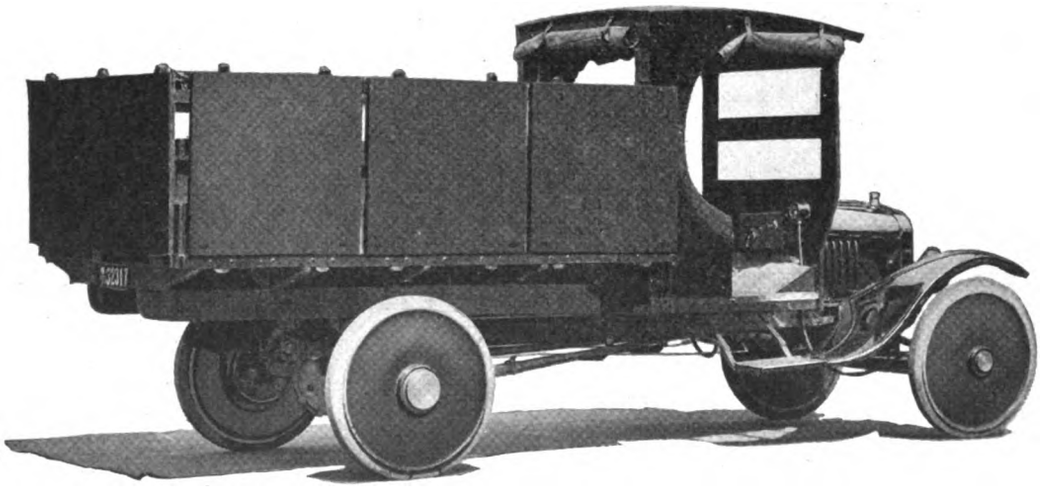
Eight months service without a dollar of expense due to breakage is the record of this Ford Truck.

It is frequently loaded at 4,000 to 5,000 pounds, yet it is able to run on "high" when other trucks must run on "low."

The original set of tires show no signs of disintegrating though they have been run more than 4,000 miles.

The mileage secured from gas consumption is increased nearly 50%. Ask for records of tests with Cornfield Wheels.

The Cornfield Wheel Co., Inc., Anna Place, Detroit, Michigan



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DIETZ LAMPS

DIETZ New "Convoy" Kerosene Truck Lamps meet several essential conditions of merit and of market, which explains why they have been so well received by Truck Manufacturers and Dealers—

FIRST: Dietz "Convoy" Lamps have proved dependable on all types of trucks and under severest conditions of road service.

SECOND: Dietz "Convoy" Lamps are a complete line—Side, Dash, and Tail Lamps.

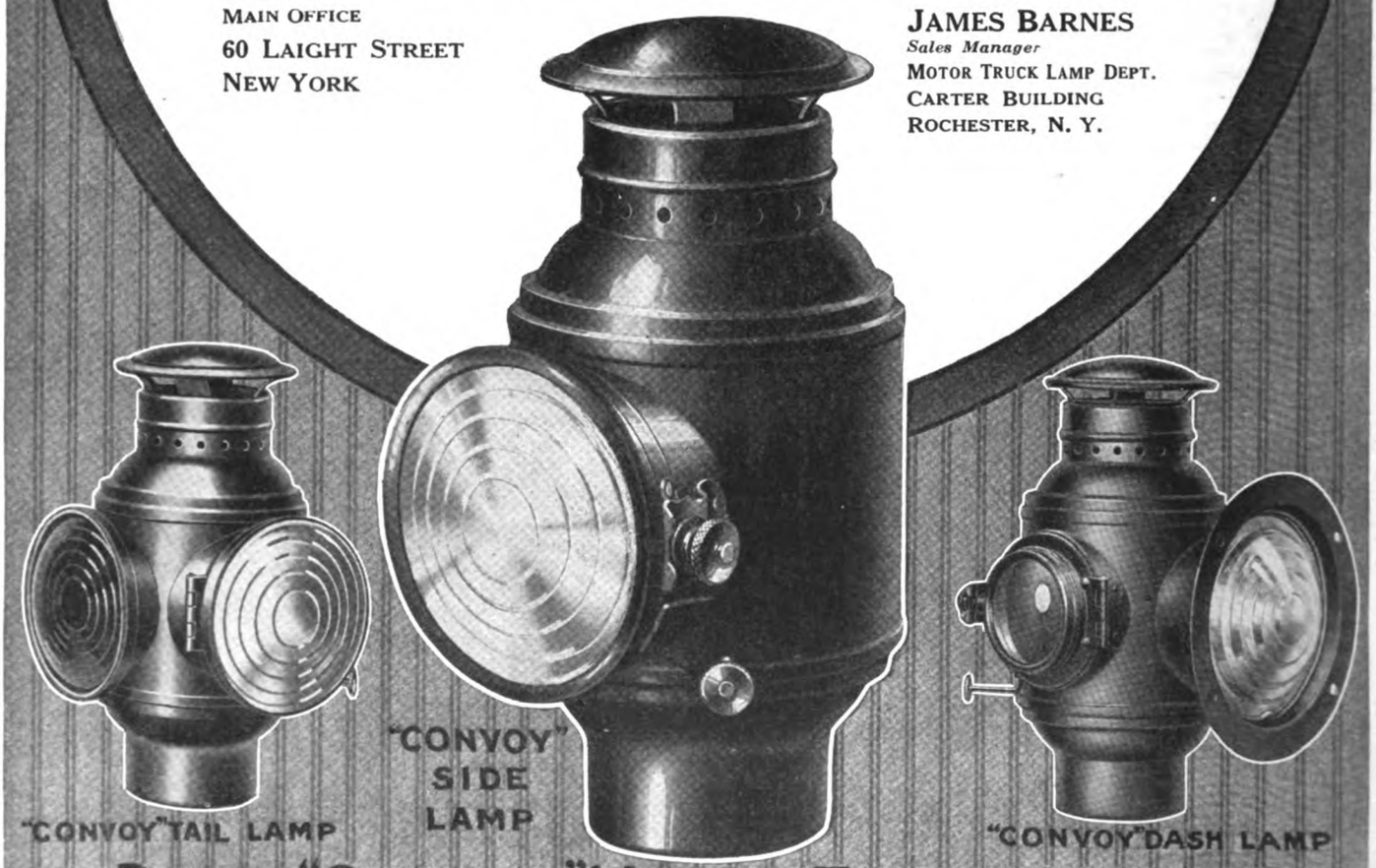
THIRD: Dietz "Convoy" Lamps meet in an effective way the demand for high grade Lamps at moderate price.

Complete Information on Request

R. E. DIETZ COMPANY, NEW YORK

MAIN OFFICE
60 LAIGHT STREET
NEW YORK

JAMES BARNES
Sales Manager
MOTOR TRUCK LAMP DEPT.
CARTER BUILDING
ROCHESTER, N. Y.



DIETZ "CONVOY" MOTOR TRUCK LAMPS

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INVESTMENT—
Pure and Simple

THE substantial merits in International Motor Truck design and construction have made themselves known over the length and breadth of this country. Wherever traffic and commerce have reached, the steady swing toward International haulage tells its story.

International Motor Trucks

are working in steady, unspectacular fashion for scores of the largest and best known industrial enterprises in the United States, as well as for many thousands of small firms and individuals. The record and the backing of this line of trucks have made International Motor Truck purchase a matter of *unquestioned investment.*

The era of motor transportation is young. Hundreds of the best and biggest dealers of a few years hence have not yet begun. International Motor Trucks are among the few leaders now in total sales. Capacities range from $\frac{3}{4}$-ton to $3\frac{1}{2}$-ton. The future for International truck and dealer is one of undoubted success. Write the address below for all the facts in regard to this line of motor trucks —the completeness of International service—the details as to dealer terms, territory, etc.

Motor Truck Department

INTERNATIONAL HARVESTER COMPANY
Of America
(Incorporated)
CHICAGO U. S. A.

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ECONOMY

In Motor Truck Transportation Means

TRAILERS

Automotive Trailers are built to deliver **"Service."** We ask and expect your business on the basis of the Service they will give in constant use. Our line consists of a size and type for every trade.

"THE FREIGHT CAR OF THE HIGHWAY"

will reduce hauling costs.

Write for full information and prices. Tell us how we can best co-operate to your mutual advantage.

Automotive Trailer Corporation

1442 McCormick Building

CHICAGO

***Factory:* Kincaid, Illinois**

Please mention "Power Wagon" when writing to advertisers.

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COMMERCIAL TRUCKS

BUILT BY THE OLDEST AND LARGEST BUILDERS OF FIRE APPARATUS IN THE WORLD

Sixty-five Years' experience in building Horse Drawn Steam Fire Engines, Hook and Ladder Trucks, Water Towers and other types for the Largest Fire Departments in the World.

Twelve Years experience in building Motor Propelled Fire Apparatus for the same duty.

American-La France Fire Trucks have met every requirement of the most severe service demanded of any type of Motor Vehicle, requiring the speed and endurance of the highest grade passenger car, combined with the load capacity and stamina of the sturdiest commercial truck.

Of Interest to Dealers

A modern commercial truck plant is now being erected near Newark, N. J., in which to manufacture a full line of

AMERICAN LA FRANCE
COMMERCIAL TRUCKS

Designed and built on the same high standards as its Fire Apparatus—

Power—Durability—Quality

Maximum performance and minimum cost maintenance, the factors which have made American-La France Fire Apparatus standard of the world, will be built into American-La France commercial trucks.

AMERICAN-LAFRANCE FIRE ENGINE COMPANY, INC.
ELMIRA, N. Y.

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SPEED

POWER

SPACE

APPEARANCE

WEIGHT

5 REASONS

for the use of the

COLUMBIAN LIGHTNING HOIST

There are are certain standards by which the ultimate efficiency of a hand hoist is judged.

Has it speed? is the first. The Columbian is well named the "Lightning Hoist." In less than two minutes it raises a dump body to an incline of from 30 to 50 degrees.

Has it power? A hoist with a test capacity of 30,000 lbs. is not a weak machine. By means of spur and bevel gears the Columbian lifts a load of six tons easily and quickly. One man at the crank does the work.

Does it occupy much space? A truck body is built for loads, not to carry a bulky, overhung hoist. The Columbian needs but nine inches of space back of the driver's seat. This enables the body load to be set forward, which rids the rear construction of excessive weight.

How does it look? Plain lines, concealed gears, and a finish that is dignified and substantial.

It is heavy? Emphatically no, in the case of the Columbian. It has the lightest weight possible with its tremendous lifting power.

Every objection formerly offered to hand hoists is nullified by the foresighted construction of the Columbian.

It's the ideal hand hoist for every line of business that requires dumping equipment that will save time and economize on labor.

Truck Dealers: We will gladly confer with you about supplying the right hoist for your truck line whenever a sale is made involving the use of a hoist. Write us! Ask for folder No. 69.

The Columbian Steel Tank Co.

1601-21 West 12th St. Kansas City, Mo.

"Tanks for the World" Established 1894

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Mack TRUCKS

Again, "Performance Counts"

"....Reaching Moneta at midnight (after more than 500 record-breaking miles under heavy load) one of the two Mack Trucks hooked onto a trailer and the truck and trailer delivered 17½ tons of tomatoes by next morning to a cannery 25 miles away."—*News Service Bureau, International Motor Co.*

A TYPICAL long-haul Mack performance! Where the going is continuous and the toil hardest—there you will find Mack Trucks pushing their work through on rigid schedules. The Mack is a selected truck—a self-sufficient unit engineered to the very peak of mechanical excellence. Hence the uniformly striking character of Mack performance. *Capacities 1½ tons to 7½ tons.*

INTERNATIONAL MOTOR COMPANY
NEW YORK

"PERFORMANCE COUNTS"

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Wilson dependable MOTOR TRUCKS

IT IS not alone for their rugged strength and their get-there-and-back ability that great corporations continuously purchase Wilson trucks.

Big business looks also to mature age—to that ripened experience which bespeaks a worthy and dependable product.

And in their purchases of Wilson trucks you will find that the United States Government, and scores of industrial concerns like Standard Oil, the United States Cartridge Company, the Coffin Packing and Provision Company, the Armstrong Transfer Company, the Postal Telegraph Company, have been influenced, in a very large degree, by the fact that Wilson trucks have now been built for eight years; and that back of all this are still twenty-nine additional years of commercial vehicle manufacture —an honorable record covering *thirty-seven* years in all.

Send for Our Free Book
"Money in Motor Trucks"

1½—2½—3½—5 Ton—All Worm Drive

J. C. WILSON COMPANY, DETROIT, U. S. A.

London ***Export Office:*** **100 Broad Street, New York**

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HIGHWAY TRAILER

EDGERTON WISCONSIN

Sell the Trailer That Firms Like These Buy

These Are a Few Truck Operators Using Fleets of Highway Trailers

U. S. Army, U. S. Navy
"Piggly Wiggly" Chain Stores
Headquarters, Chicago, Ill.
The National Tea Company
The Consumers Refining Co.
Chicago, Ill.
The Cadillac Motor Car Co.
Detroit, Mich.
The Timken-Detroit Axle Co.
Detroit, Mich.
The Sterling Motor Truck Co.
Milwaukee, Wis.
The Manitowoc Ship Yards
Manitowoc, Wis.
Fairbanks-Morse Company
Beloit, Wis.
Southwestern Telephone & Telegraph Company
St. Louis, Mo.
Melchior, Armstrong & Dessau
Buenos Aires, Argentine
Montevideo, Uruguay
Barbados Islands
Towars Creamery Company
Detroit, Mich.
Hilty Lumber Company
Milwaukee, Wis.
City of Washington, D. C.
Day Claire County Road Com.
Wisconsin
One-Wheel Truck Company
St. Louis, Mo.
Globe Manufacturing Company
Battle Creek. Mich.
The T. M. E. R. & L. Company
Interurban Express

They Utilize Their Waste Power With Highway Trailers, Instead of Adding More Trucks Undersell Average Trailers $200 to $300

Efficient transportation at lower cost, has won a big, swiftly increasing market for Highway Trailers.

Thousands of truck operators now employ them, who formerly bought trucks to meet their increase haulage needs. Their advantages are clear-cut and convincing.

They add just as much hauling capacity as additional trucks. They require no added drivers. Operating cost 1 cent per ton mile as against 18 cents for the average truck.

And they cost $1875 to $3955 less per unit.

No wonder truck operators everywhere are adopting them to increase haulage capacity instead of adding expensive trucks. They are used in more than 200 lines of business.

The U. S. government accepted Highway trailer standard design, exclusively without modification, and operates more than $1,000,000 worth.

You can sell such dominant advantages as these. Every truck in your territory is a prospect. This is your opportunity to build a big, profitable business. Write for details today.

See What Highway Trailers Save

Average Truck Cost	1½ Ton $2600	2½ Ton $3500	4 Ton $4000	6 Ton $5500
Highway Trailers Costs	1½ Ton $725	2½ Ton $935	4 Ton $1225	6 Ton $1545
Highway Trailer Saves	$1875	$2565	$2775	$3955

Highway Trailers are Used in Truck Trains Throughout the Country. The Illustration Shows them in Service with the T. M. E. R. & L. Co. Interurban Express

23)

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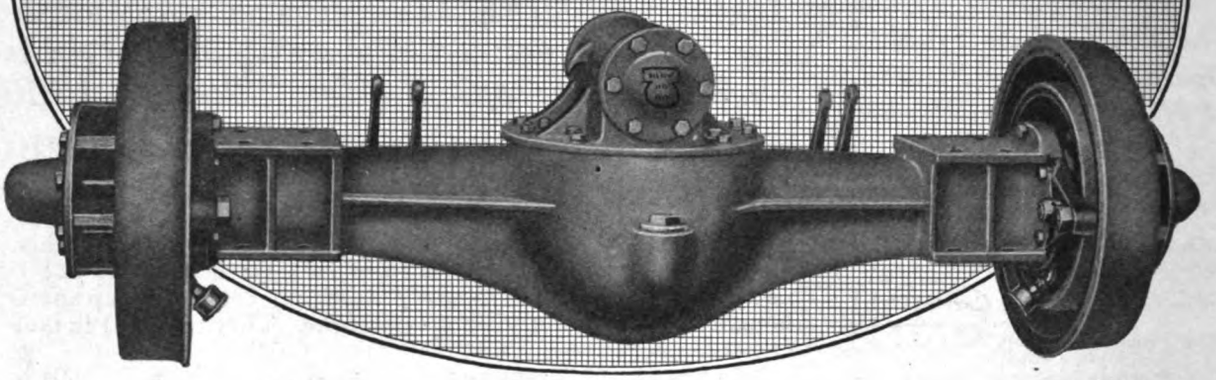
WISCONSIN AXLES



Wisconsin Axles and Scientific Construction

Disassemble a Wisconsin Axle and compare it piece by piece with any other. You will find why it is used under America's best trucks.

It has fewer parts, which means longer life, less adjustment and less trouble.

It has a housing which has never failed in service. No axle in the world can show a better record.

The service brakes are exceptionally large and are protected from oil and dirt in a special way.

Shafts and bearings are oversize. If similar axles are used as a criterion better material cannot be purchased.

WISCONSIN PARTS CO.

OSHKOSH, WISCONSIN

(18)

WISCONSIN CUSTOM BUILT AXLES

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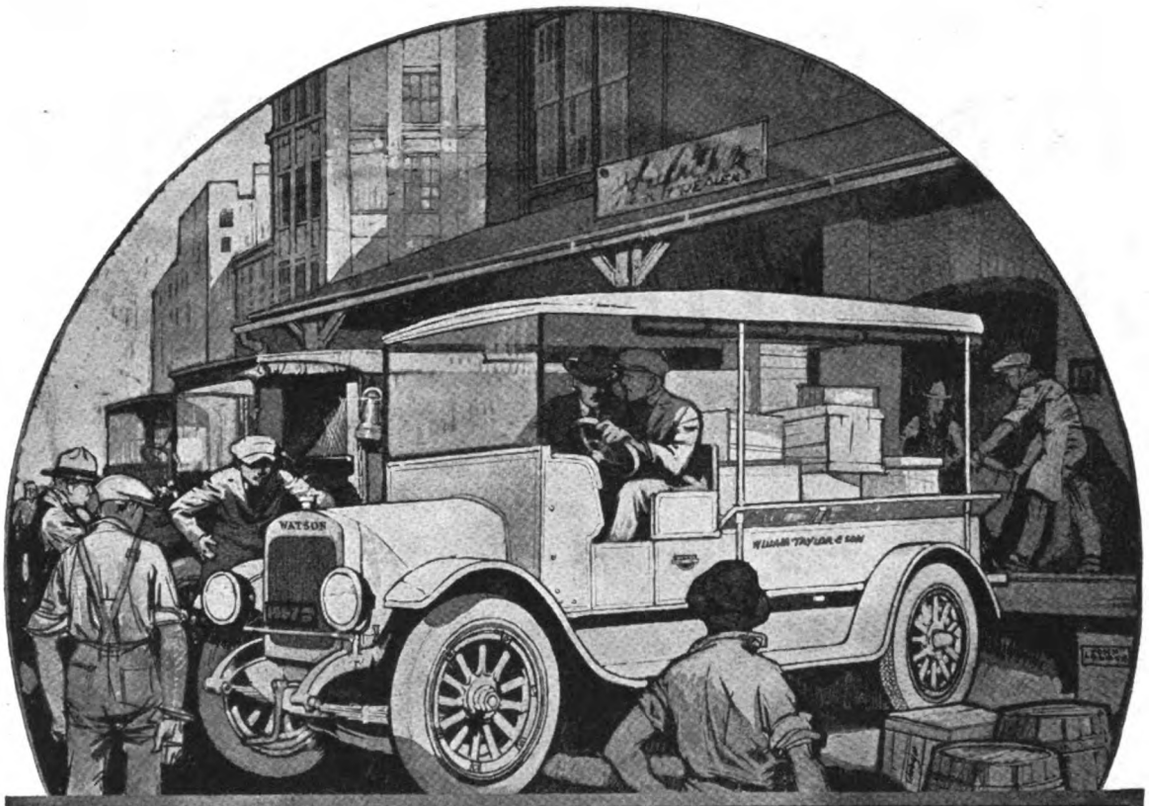

Complete Hauling Systems

The Watson Line includes all the essential hauling units—Motor Trucks, Road Tractors, Trailers and Dumping Wagons. From this one Line, it is possible to assemble complete, standardized Haulage Systems—combinations of those units exactly suited to the most economical handling of practically **any** hauling problem.

To the Dealer in hauling equipment, the Watson Line offers unlimited opportunities to fully supply the hauling need of **any** industry or business.

Watch This Watson ¾-1 Ton

Watch it on city streets, country roads, hills, thru mud, sand, snow. Watch is speed along at 30—loaded—and plug thru and past any obstruction that almost any motor truck can negotiate. Watch this Watson work.

Write for full particulars

Watson Products Corporation
Main Office and Plant: Canastota, N. Y.

WATSON
HAULAGE SYSTEMS
MOTOR TRUCKS
ROAD TRACTORS

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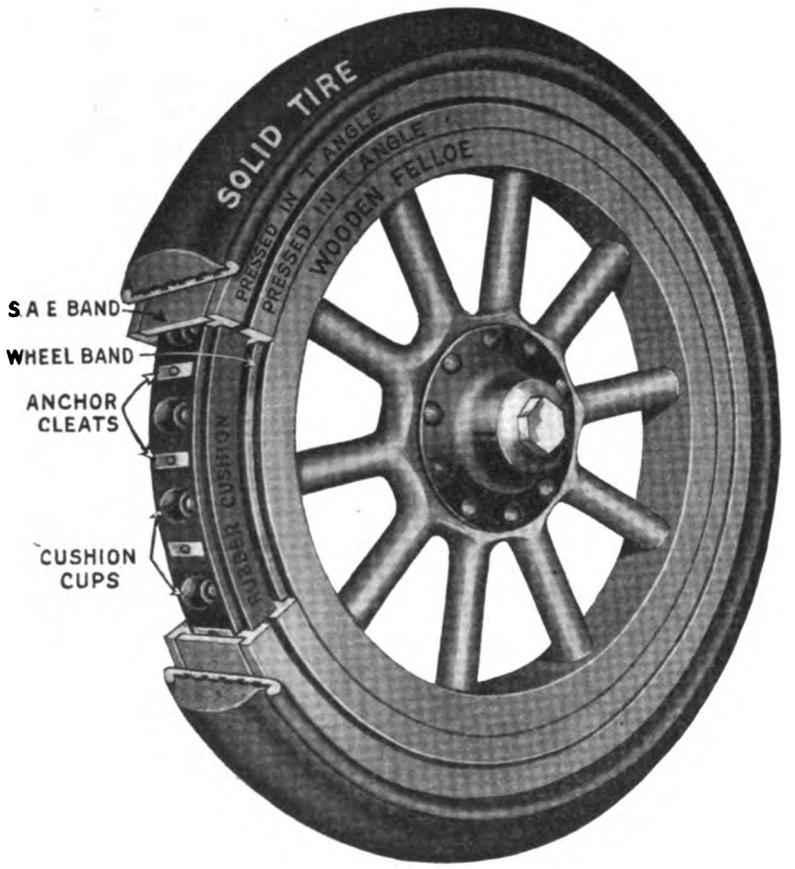
MARTIN
CUSHION WHEELS
for Motor Trucks

No bolts
No nuts
Pressed on
Throughout
Light
Strong
Resilient
Durable



Backed
by
Nine Years'
Experience
in Building
Good
Cushion
Wheels

Adopted for Standard Equipment on
"OLD RELIABLE" MOTOR TRUCKS
1½ to 7 Ton

MARTIN CUSHION WHEEL CO.
311-13 N. Sangamon St. **CHICAGO, ILLINOIS**

Branches and Service Stations in All Principal Cities

QUOTATIONS SENT UPON REQUEST

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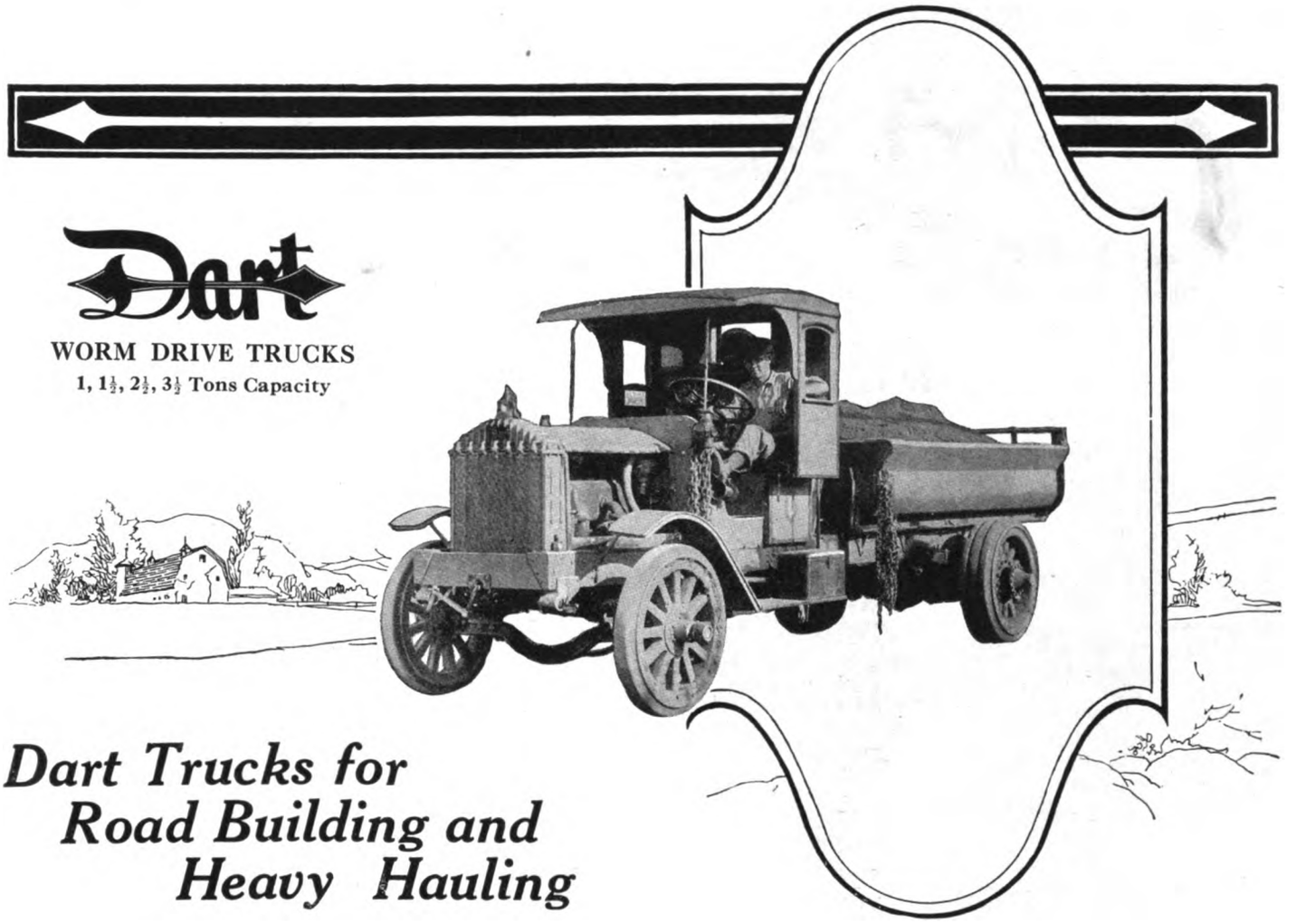
Dart

WORM DRIVE TRUCKS
1, 1½, 2½, 3½ Tons Capacity



Dart Trucks for Road Building and Heavy Hauling

The DART is a heavy-duty truck—designed and built from the ground up to handle its rated capacity under all haulage conditions. Its sturdy construction and reliable performance have been proven in all lines of business with all kinds of loads.

These are the features that have caused DART heavy-duty trucks to be adopted as standard equipment in nearly every line of business:—

MOTOR—Buda heavy-duty type—designed to meet the exacting conditions of heavy service.

DRIVE—Worm final drive: most efficient. Improves with use. Gives straight line drive under all loads.

TRANSMISSION—Three speeds forward on the 1 and 1½ ton models four speeds forward on the 2½ and 3½ ton models gives increased operating economy for heavy loads. The greater power range lengthens the life of the truck and saves the mechanism from unnecessary vibration.

Dealers—Sell the Dart!

The truck that gives the greatest satisfaction to the owner is the truck you should sell. Find out why the DART has so large a percentage of reorders—the sure gauge of truck satisfaction.

BLUE "J" TRACTORS, TOO

The BLUE "J" Tractor is the worthy companion of the DART Trucks. It is known as the aristocrat of farm tractors. Years ahead in design. The Dart Truck and Tractor combination enables you to offer the highest quality machine in both lines.

Dart Truck and Tractor Corporation
Waterloo, Iowa U.S.A.

Please mention "Power Wagon" when writing to advertisers.

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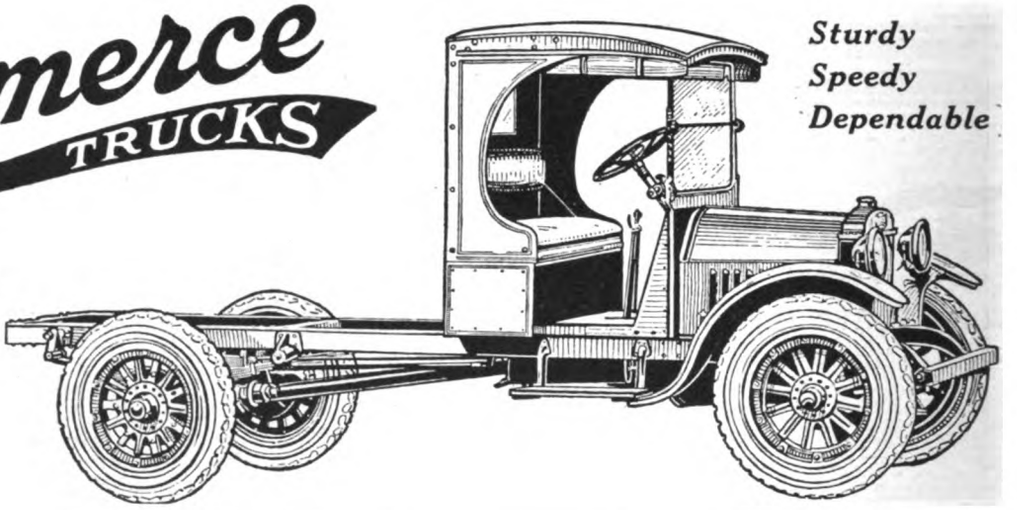
Commerce TRUCKS

Sturdy
Speedy
Dependable

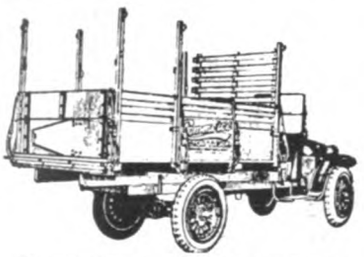


Chassis Prices:
$1690 to $2065
f. o. b. Detroit, Mich.
Cab Top Extra

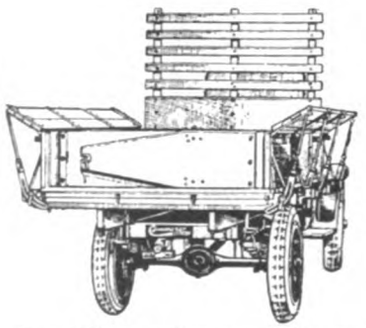
Two Chassis
1-1½ Ton
1½-2 Ton
Capacities

Open Express Body

Express with Canopy Top



Hauls Grain, Tight and Loose Materials



Hauls Loose, Packed, or Boxed Materials

Commerce Dealers Must Make Money

THERE is not a Commerce Motor Truck Dealer who has not made money in 1919 selling Commerce motor trucks—if he did not make money we would not permit him to continue with us as a dealer.

In 1920 our policy is to spread Commerce Trucks over a Nation Wide Territory instead of concentrating in Trade Centers.

If your locality is open for the sale of Commerce Trucks, write us, we will furnish you the names of Commerce Dealers, who have conditions similar to your own. After consulting them, we will tell you about the Commerce Franchise.

A Wide Range of Bodies.

The Commerce Motor Car Company

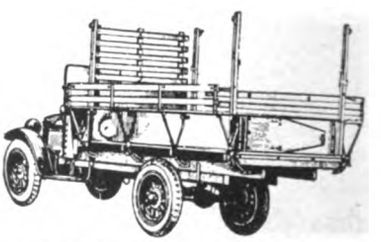
Largest Mfgrs. of 1-2 Ton Trucks in the World

10th Year **Detroit, Mich.**

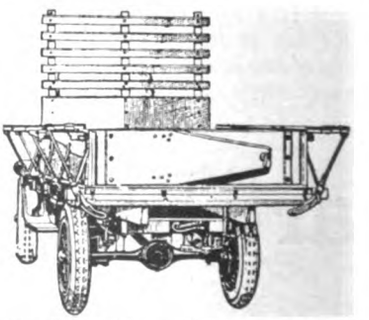
Stock Rack with Watertight Under Body

Steel Dump with Hoist

Platform and Convertible Stake Body



Hauls Country Produce and Passengers



Handles Hay — Diversified City Loads

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Universal TRUCK WHEELS

Steel Cushioned Wheels — **HUBLESS** — **FULL FLOATING** — **Mead Cushioned Wheels**

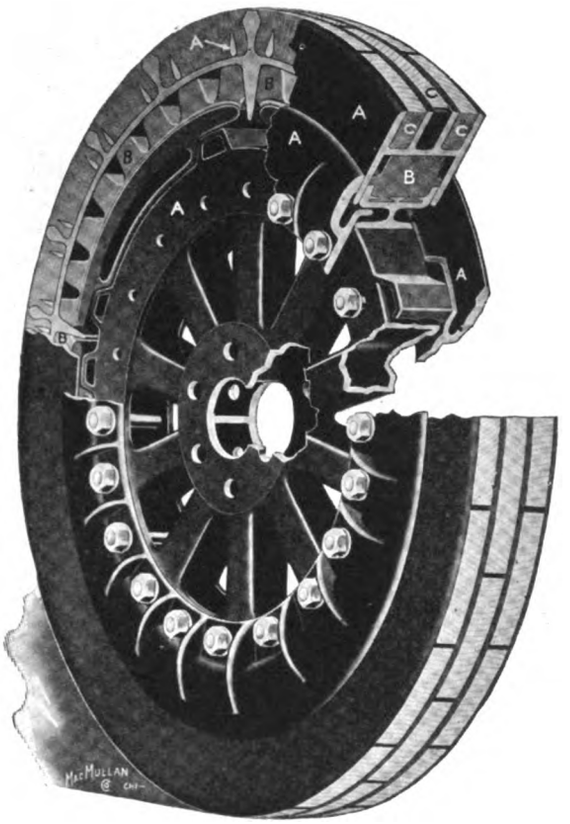
A Practical Wheel for Trucks, Tractors and Trailers

Simple in Construction

Mechanically Correct in Construction

Vibrations and Hammer Thrusts from Road Contact are Absorbed in the Wheel

The Wheel Designed with a Knowledge of Traffic Conditions



A—Steel; B—Rubber; C—Wood

This Wheel Excels in Resiliency, Efficiency, Durability and Economy.

Reduces Gasoline Expense 25%

Reduces General Upkeep Expense More than 50%

Protects the Engine and Chassis against Crystallization

A Practical Wheel for Any Truck on Any Road with Any Load

This Wheel Meets the Growing Demand of Truck Users for Reducing Upkeep, and for Protection from Engine, Tire and Chassis Troubles.

A Wheel With Perfect Drawbar Pull

This Wheel Rides with the Resiliency of Pneumatic Tires and is not injured by Oils, Acids, Salts or Other Chemicals, because the Rubber is fully protected.

Initial Investment Compensated by Reduced Aftercost Plus Upkeep

PITTSBURGH TRUCK WHEEL CORPORATION
General Offices: 624 Bessemer Building
PITTSBURGH, PA.

Digitized by Google

The New Bethlehem Delivery Boy

A truck aimed at a gigantic market

THE New Bethlehem ¾ Ton Dependable Delivery opens up the World's biggest truck market. A tangible, definite, responsive market. Visualize the possibilities in your territory of a light truck that is a real truck designed and built on truck specifications from radiator to tail lamp—a truck with speed—power—strength and enduring economy. A swift and sure deliverer.

Someone in your community is going to see the Big Business Possibilities behind the Bethlehem Franchise. Someone is going to add his name to ours and dominate the motor selling field. *Are You the Man?*

¾ Ton Chassis	2½ Ton Chassis
1½ Ton Chassis	3½ Ton Chassis

BETHLEHEM MOTORS CORPORATION

Allentown **Pennsylvania**

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Universal TRUCK WHEELS

Steel Cushioned Wheels

HUBLESS FULL FLOATING

Mead Cushioned Wheels

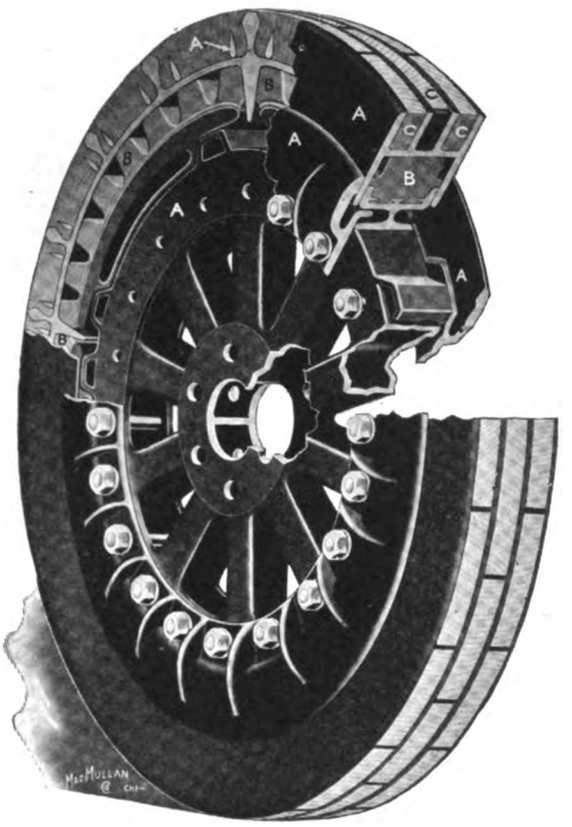
A Practical Wheel for Trucks, Tractors and Trailers

Simple in Construction

Mechanically Correct in Construction

Vibrations and Hammer Thrusts from Road Contact are Absorbed in the Wheel

The Wheel Designed with a Knowledge of Traffic Conditions



A—Steel; B—Rubber; C—Wood

This Wheel Excels in Resiliency, Efficiency, Durability and Economy.

Reduces Gasoline Expense 25%

Reduces General Upkeep Expense More than 50%

Protects the Engine and Chassis against Crystallization

A Practical Wheel for Any Truck on Any Road with Any Load

This Wheel Meets the Growing Demand of Truck Users for Reducing Upkeep, and for Protection from Engine, Tire and Chassis Troubles.

A Wheel With Perfect Drawbar Pull

This Wheel Rides with the Resiliency of Pneumatic Tires and is not injured by Oils, Acids, Salts or Other Chemicals, because the Rubber is fully protected.

Initial Investment Compensated by Reduced Aftercost Plus Upkeep

PITTSBURGH TRUCK WHEEL CORPORATION
General Offices: 624 Bessemer Building
PITTSBURGH, PA.

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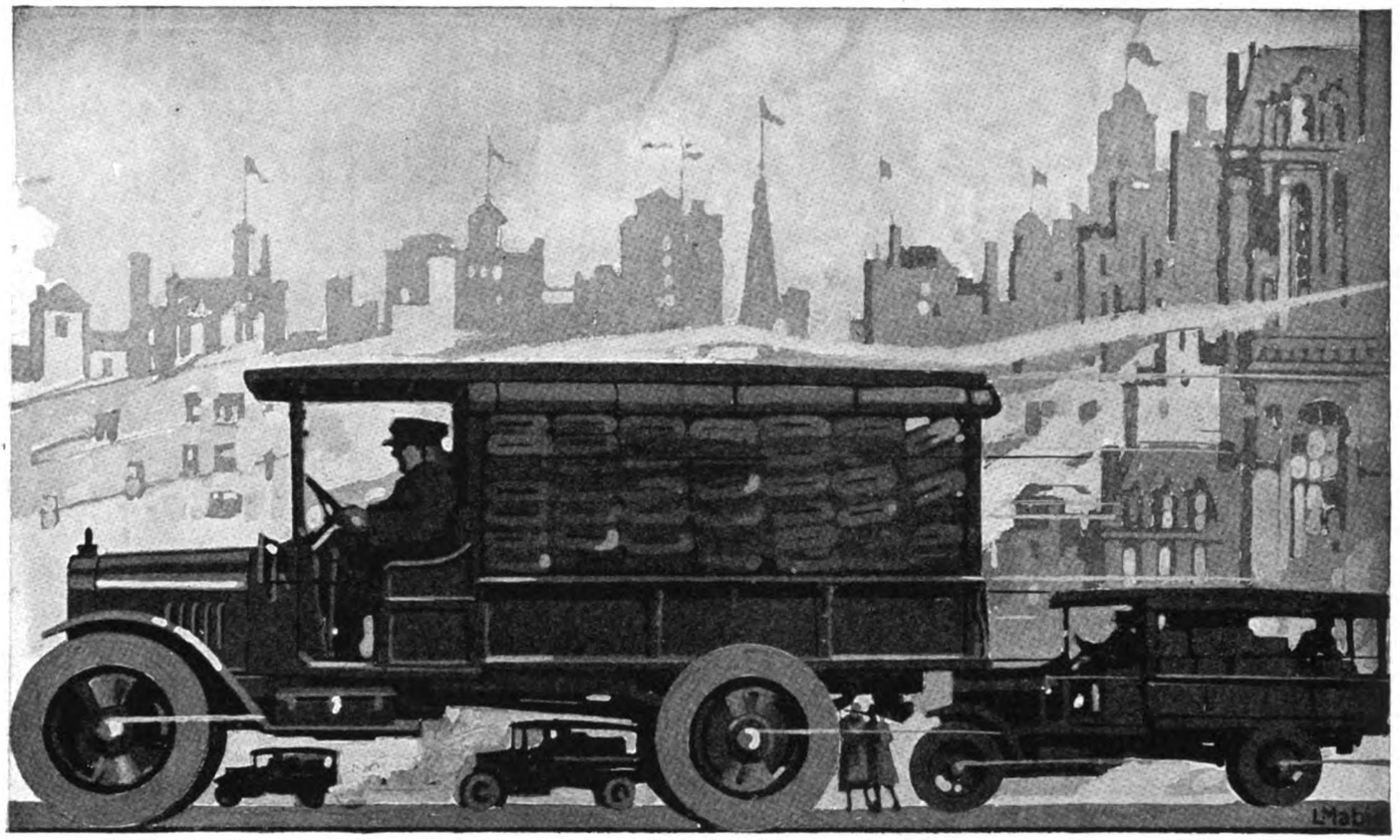

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BETHLEHEM MOTORS CORPORATION

Allentown **Pennsylvania**

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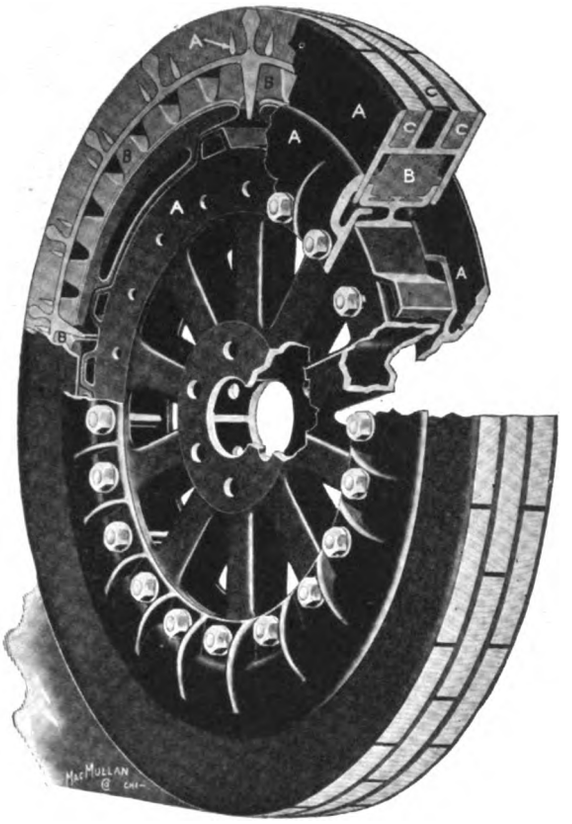

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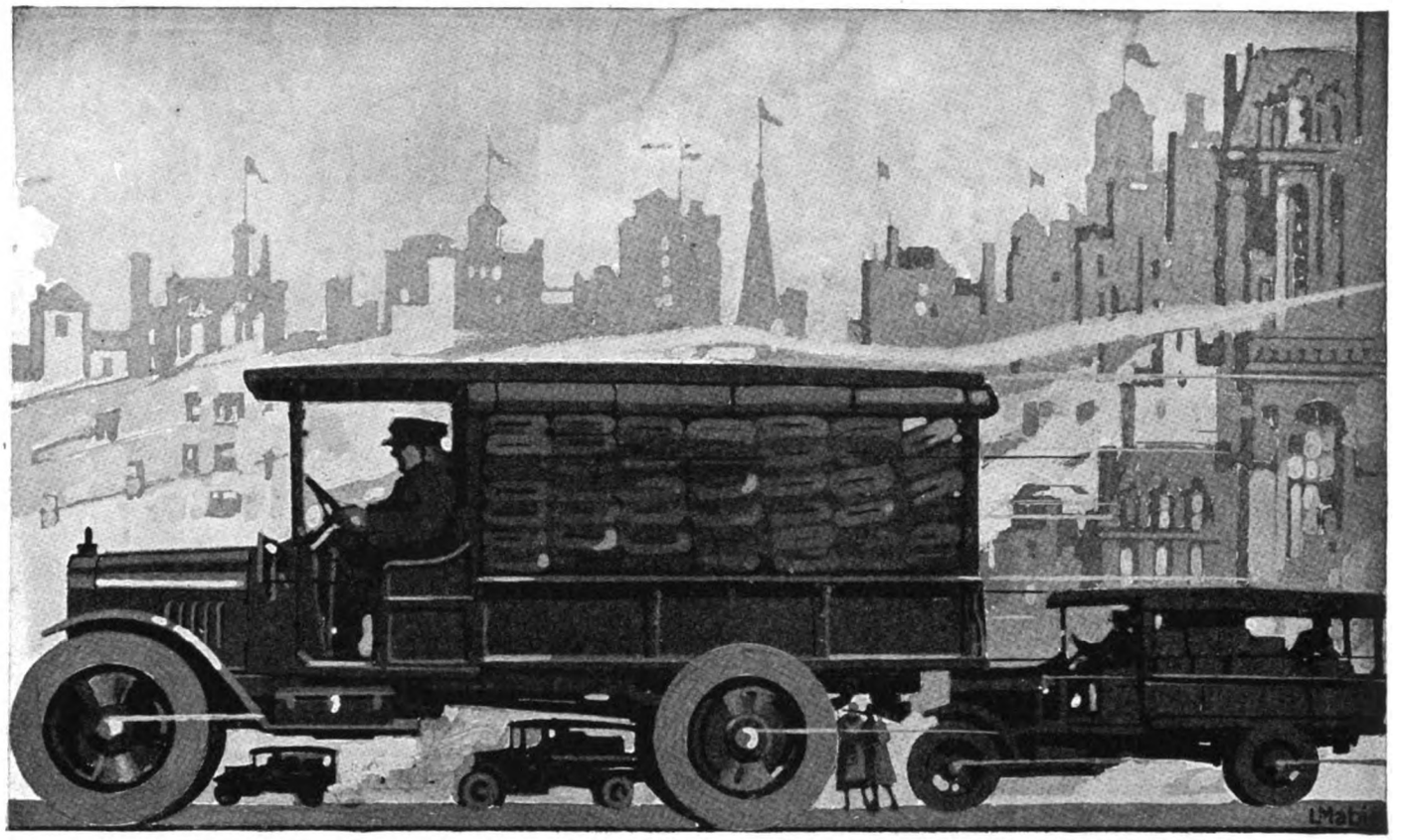

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BETHLEHEM MOTORS CORPORATION

Allentown **Pennsylvania**

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Universal

Steel Cushioned Wheels **HUBLESS** **FULL FLOATING** **Mead Cushioned Wheels**

TRUCK WHEELS

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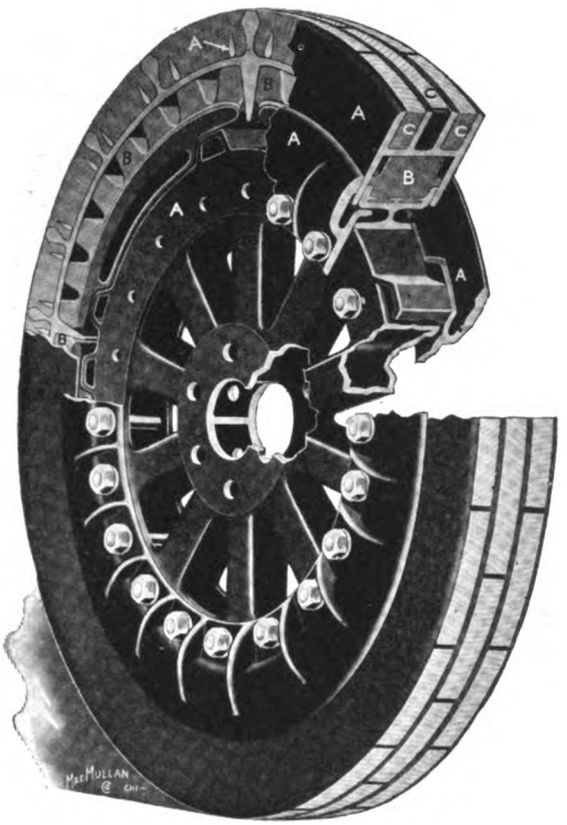

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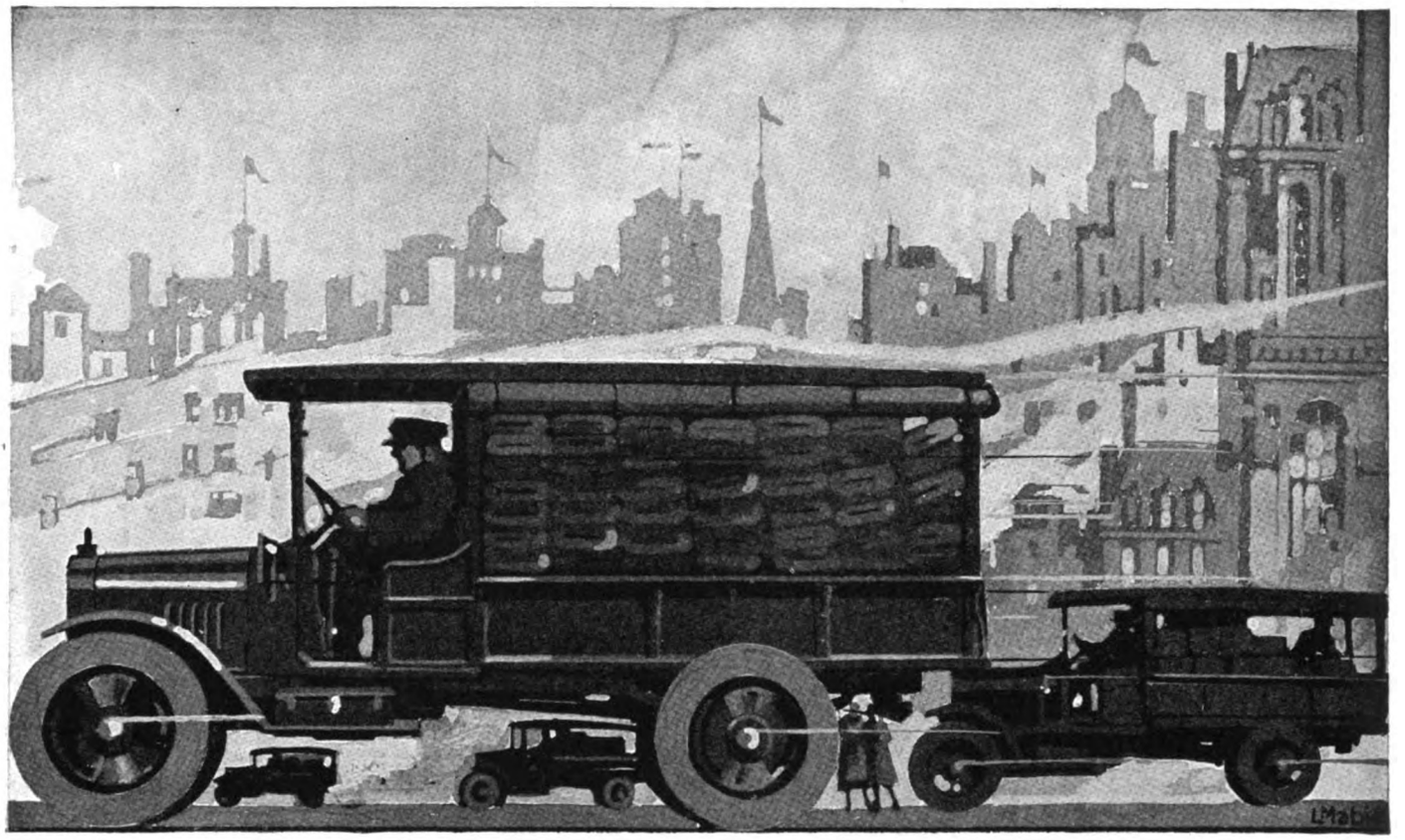

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BETHLEHEM MOTORS CORPORATION

Allentown Pennsylvania

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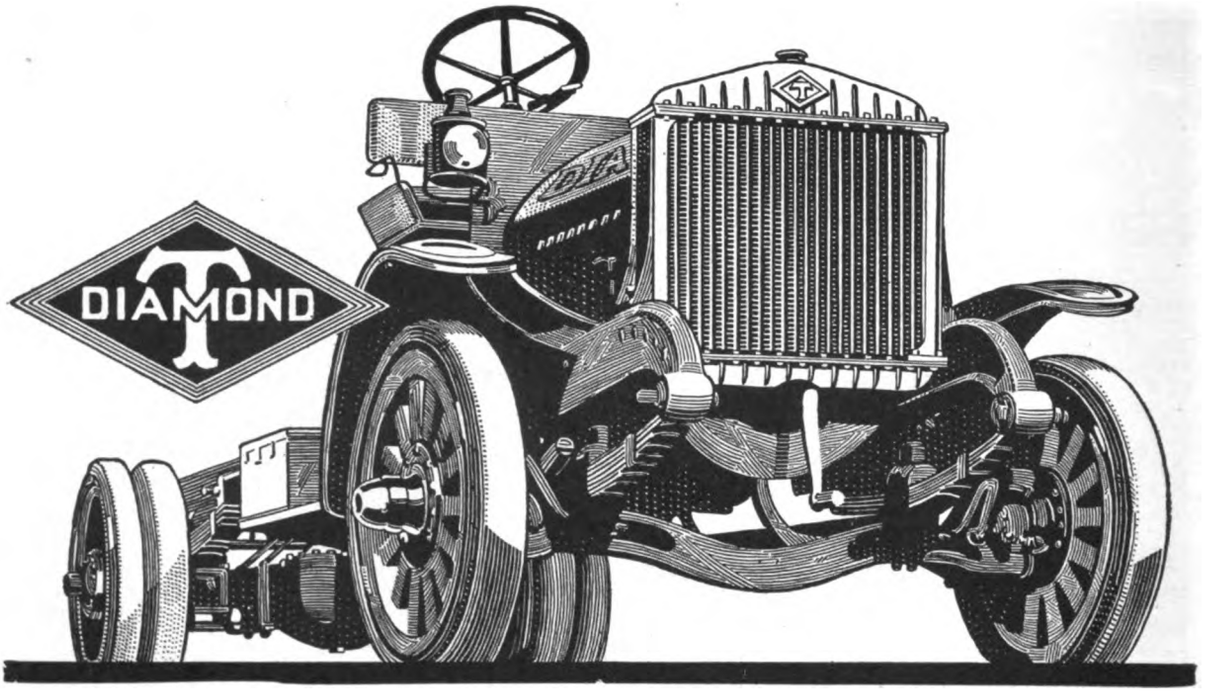

Profits in Performance

Business isn't built on promises. It depends upon Performance.

That's why Diamond T dealerships have proven profitable—because Diamond T trucks *perform*.

Satisfied owners throughout the world attest Diamond T economy, long life, dependability and uninterrupted service. Accurate records lend added proof. These are not claims, but *facts*.

Such facts mean profits and growing prosperity to dealers. There may be an opening in your territory. Wire or write, and let us prove that they *are* facts.

DIAMOND T MOTOR CAR COMPANY

4526 W. 26th Street CHICAGO, ILLINOIS

BUILDERS OF

"The Nation's Freight Car"

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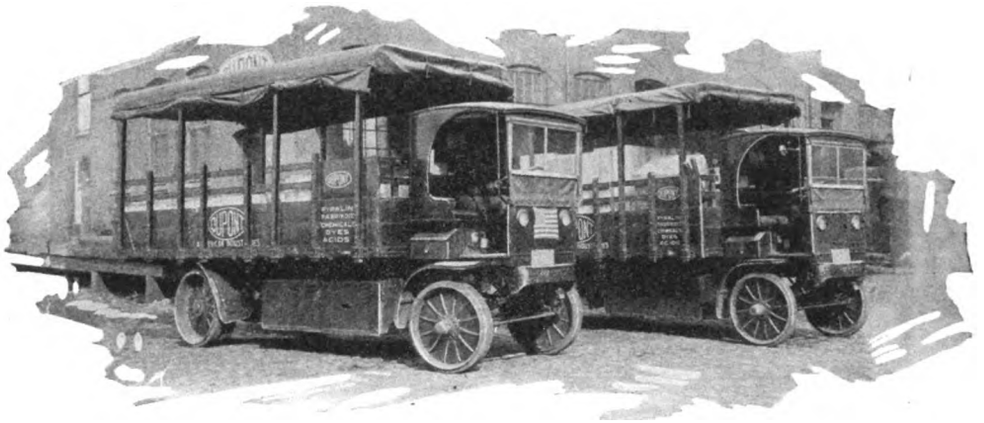
THE ELECTRIC STORAGE BATTERY CO.



SOLVE YOUR TRANSPORTATION PROBLEMS

The Electric Truck equipped with the "Ironclad-Exide" Battery will give you long, dependable service. For short hauls and congested city traffic it will show greater economy and lessdepreciation than any other form of transportation.

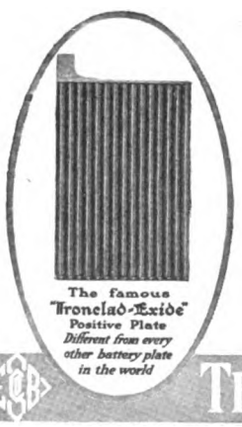
Thousands of electric trucks throughout the United States are equiyed with

The "Ironclad-Exide" Battery

(Unlike Any Other Battery in the World)

It has shown conclusively its all-round superiority by its economy of operation, reliability of performance and capacity for strenuous work.

The Electric Vehicle Department of our nearest office will be glad to give you facts and figures that will help you solve your battery problems.



THE ELECTRIC STORAGE BATTERY CO.

The largest manufacturer of Storage Batteries in the world

1888 PHILADELPHIA, PA. 1920

New York Boston Chicago Denver San Francisco St. Louis Cleveland Detroit Washington Minneapolis Kansas City Atlanta Pittsburgh Rochester

Special Canadian Representatives: Chas. E. Goad Engineering Co., Ltd., Toronto, Montreal

Batteries are made by this Company for every storage battery purpose

THE ELECTRIC STORAGE BATTERY CO.

Please mention "Power Wagon" when writing to advertisers.

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Victor

1½ and 2½ tons

The Victor worm drive motor truck is designed to stand rough usage and to give long and continuous service. That it is doing this is evidenced by repeat orders and its large number of satisfied users.

Victor dealers have the satisfaction of knowing that the Victor will make good on every claim that is made for it.

Your territory may still be open.

Write for particulars.

Victor Truck Company

St. Joseph Michigan

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Molybdenum Steels

Commercial Quantity Production

SOME metallurgists and alloy steel manufacturers, while recognizing superior qualities in Molybdenum Steels, have hesitated to adopt them in the absence heretofore of complete and authentic data covering results in commercial quantity production.

To such is our book—"Molybdenum Commercial Steels"—particularly addressed. This book, from cover to cover, confines itself to definite results obtained in commercial practice with many thousands of tons of Molybdenum Steels used during the War and since.

For Copies of the Book Address

Climax Molybdenum Co.
or
The American Metal Co., Ltd.
61 Broadway
New York

PROVEN IN WAR FOR THE TASKS OF PEACE

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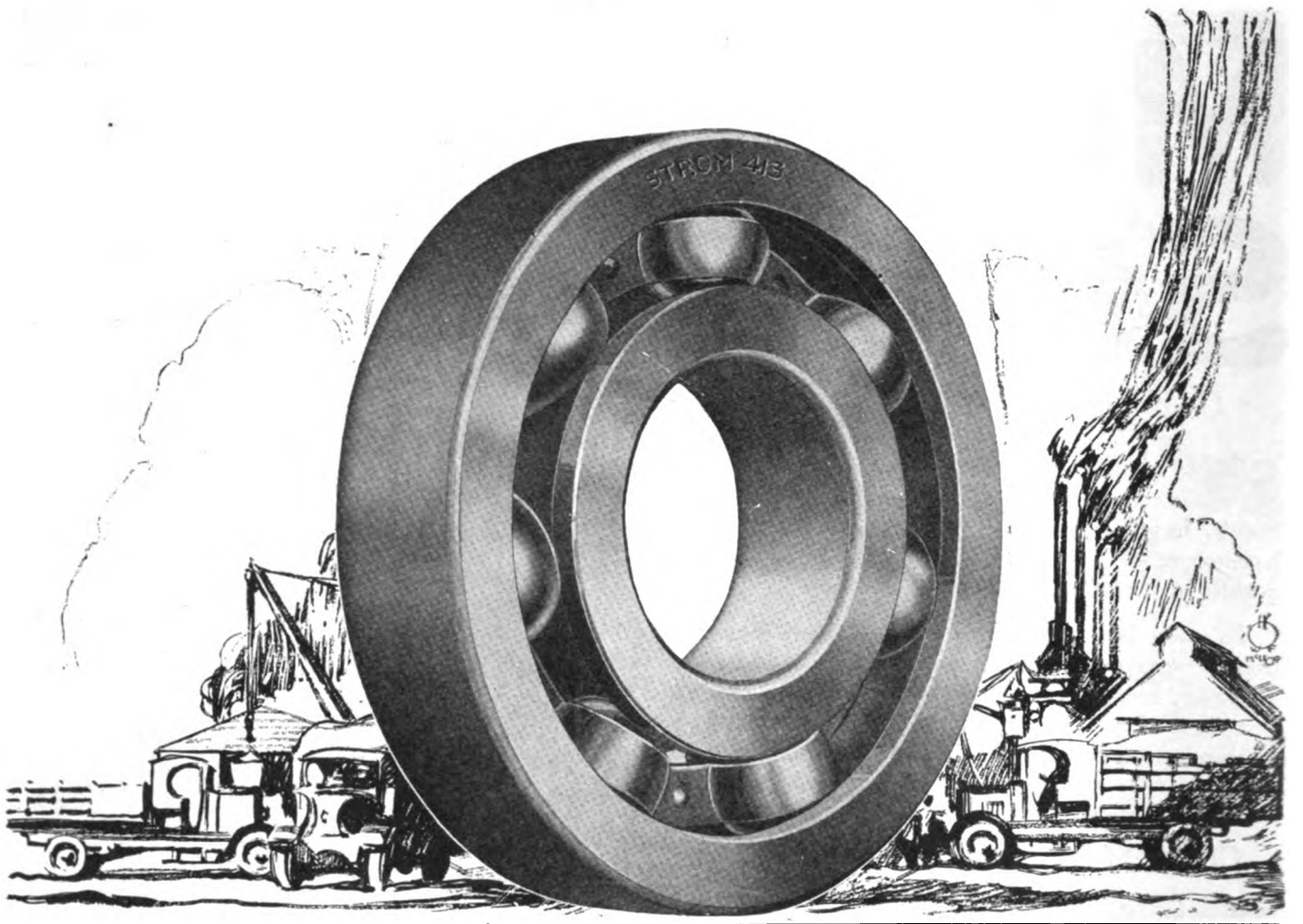

Strom Bearings Cut Truck Hauling Costs

The reduction of friction and consequent saving of power by the use of Strom bearings enables the motor truck to carry larger loads at less cost.

Strom bearings are made of best materials and with an accuracy that insures perfect bearing service. Heat-treated by the most modern and approved methods, they give maximum service.

Wherever a shaft turns — in any industry—Strom bearings are most economical. Daily they are proving their quality by the high character of their performance.

Installation of bearing equipment is a highly specialized engineering problem. Strom experts are at your service if you have a bearing problem to solve.

U. S. BALL BEARING MFG. CO.
(Conrad Patent Licensee)
Palmer St., Kolmar Ave., Chicago, Ill.

Strom BEARINGS

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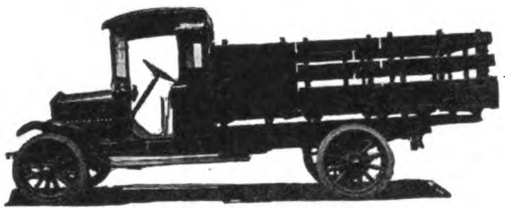
Rainier Sales "Come Through Clean"



Rainier

PRICE LIST
March 1, 1920

RAINIER
Worm Drive Delivery Trucks

CHASSIS PRICES
(F.O.B. New York)
Including Equipment as Per Catalogue

Model R-11	— ¾ Ton - - - - -	$1850
Model R-9	— 1 Ton - - - - -	2050
Model R-6	— 1½ Ton - - - - -	2150
Model R-8	— 2 Ton - - - - -	2650

RAINIER SALES "Come Through Clean"

A PIECE of high-class machinery, —dependable and trustworthy —that is what the dealer delivers who represents the Rainier Truck.

Rainiers keep promises without any trailer of tinkering and trouble. And so the success of Rainier distributors becomes a simple problem of energetic selling—never crippled by a history of expensive break-downs or defects.

The Rainier distributor can estimate the number of cars he will sell and the gross profit he will realize. He can be certain that the net profits will be uniform—for the kind of units and engineering that are behind the Rainier is the finest warrant of a truck that will hold the road—and earn profit for both the man who buys and the man who sells the Rainier!

Rainier Sales Come Through Clean! Can You Swing the Rainier Agency?

Real selling ability is the first consideration —preferred even to a large initial order The territory offered is exceptional—the contract terms most liberal. Write for details.

Rainier Motor Corporation
SALES DEPARTMENT
225 West 58th Street, New York
Factory—Flushing, Long Island, New York

SPECIFICATIONS

MOTOR—Continental Red Seal in all models

CLUTCH—Brown-Lipe multiple disc

SPRING CONSTRUCTION—Patented double safety shackle on front end of rear springs

TRANSMISSION — Brown-Lipe

REAR AXLE—Timken and Sheldon worm and gear

CARBURETOR—Zenith, with Stewart Vacuum system and Monarch Governor

IGNITION—Simms or Bosch Magneto

WHEELBASE—¾ Ton 125"; 1½ Ton 133"; 2 Ton 147"

LOADING SPACE—¾ Ton 90"; 1½ Ton 9' to 10'; 2 Ton 11' to 12'

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What this Tenth Year Label Means to the Federal Dealer

Primarily, it means that Federal is ten years old—going on eleven.

But it means more than that to Federal Dealers and distributors.

In the first place, it will represent experience—ten years of careful, intelligent effort that has given Federal such an enviable reputation among trucks.

To the dealer this means that the truck he sells is not an experiment, but the product of millions of miles of real transportation experience.

And this Federal tenth year tag also stands for responsibility. It means that back of every dealer stands a company that has led in every field of truck transportation since it was founded ten years ago, a company that is sound in its financial strength, and high in the confidence that a general public holds for it and its products.

The tenth year label that we have pictured above will be attached to every Federal truck purchased in 1920 It will represent something very tangable and very valuable to every Federal dealer and distributor.

FEDERAL MOTOR TRUCK COMPANY DETROIT, MICHIGAN

Another

FEDERAL

One to Five Ton Capacities

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Stewart Custom Built NECESSITIES For Motor Trucks

Stewart Speedometer for Motor Trucks Model 131-M $35

Cost per Mile is the Vital Problem!

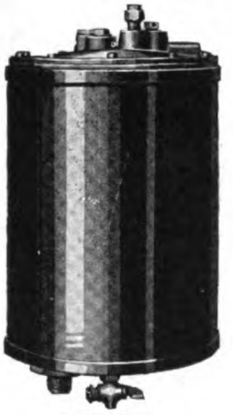
WITHOUT a Stewart Truck Speedometer you are in the dark. With it, **you know.** To be operated with greatest efficiency and economy, every truck **must** have a Stewart Speedometer. Tells you the mileage you get from gas, oil and tires. Tells you how much territory your truck covers daily. Pays for itself by reducing expenses.

The Stewart Vacuum System is the only thoroughly satisfactory, absolutely trouble-proof gasoline feed for trucks ever devised. A Stewart Warning Signal to clear the road, and Stewart Searchlights to prevent accidents after dark, are other safety-first necessities that no truck can afford to be without.

Truck dealers find the Stewart line most profitable to handle
Write for Proposition

Stewart-Warner Speedometer Corporation
Chicago, U. S. A.

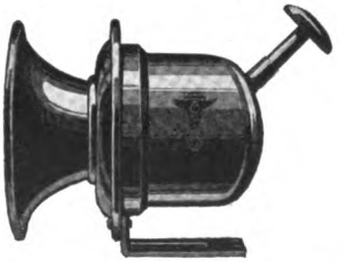
Stewart Speedometer for Motor Trucks Model 131-Y $25



Stewart Heavy Duty Vacuum System $18

Stewart Searchlight Model 139-C $7.50 Mirror on back

Stewart Hand Operated Warning Signal Model 151-A $3.75



Stewart Hand Operated Warning Signal Model 115 $4.75

"No Motor Truck Complete Without Them"

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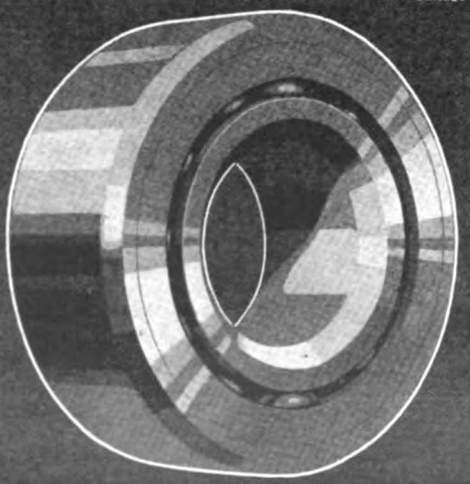
Reynolds 2½ ton truck driven from Mt. Clemens, Mich., to the Boston automobile show.
Fully equipped chassis made in 1½, 2½, 3½, 5 ton capacities.
A few responsible distributors still have an opportunity of securing this highly desirable line.

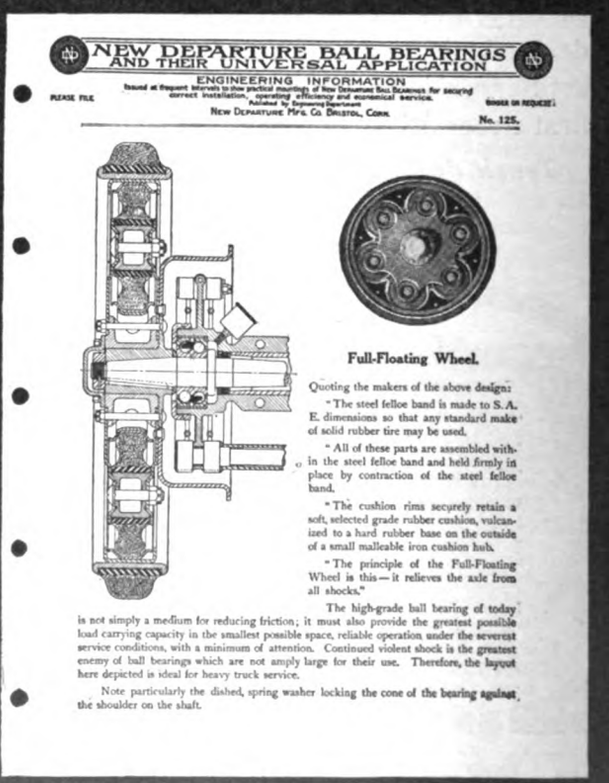
Reynolds Motor Truck Company
Mt. Clemens, Michigan

New Departure Ball Bearings

We show one of the New Departure Engineering Bulletins. There are scores of them, each one treating of New Departure ball bearing installation in different machines. We will be glad to send the whole set to you free if you are interested and will write on the letterhead of your firm, giving your official position

THE NEW DEPARTURE MANUFACTURING CO.
Detroit Bristol, Connecticut Chicago





NEW DEPARTURE BALL BEARINGS AND THEIR UNIVERSAL APPLICATION

ENGINEERING INFORMATION

Issued at frequent intervals to show practical mountings of New Departure Ball Bearings for securing correct installation, operating efficiency and economical service.

Published by Engineering Department

PLEASE FILE

NEW DEPARTURE MFG. CO. BRISTOL, CONN. UNDER OR REQUEST

No. 125.

Full-Floating Wheel.

Quoting the makers of the above design:

"The steel felloe band is made to S. A. E. dimensions so that any standard make of solid rubber tire may be used.

"All of these parts are assembled within the steel felloe band and held firmly in place by contraction of the steel felloe band.

"The cushion rims securely retain a soft, selected grade rubber cushion, vulcanized to a hard rubber base on the outside of a small malleable iron cushion hub.

"The principle of the Full-Floating Wheel is this—it relieves the axle from all shocks."

The high-grade ball bearing of today is not simply a medium for reducing friction; it must also provide the greatest possible load carrying capacity in the smallest possible space, reliable operation under the severest service conditions, with a minimum of attention. Continued violent shock is the greatest enemy of ball bearings which are not amply large for their use. Therefore, the layout here depicted is ideal for heavy truck service.

Note particularly the dished, spring washer locking the cone of the bearing against the shoulder on the shaft.

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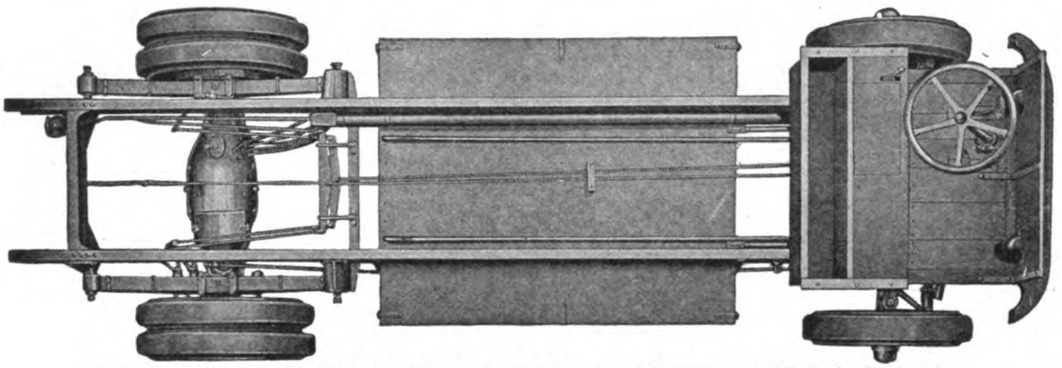
WALKER ELECTRIC TRUCKS



THE WALKER IMPROVED CHASSIS

THE UTMOST IN *SIMPLICITY*—ONE THOUSAND FEWER PARTS THAN ANY GASOLINE CHASSIS. WALKER ELECTRIC CHASSIS ARE OPERATING *PROFITABLY* IN ALL INDUSTRIES.

ASK ANY WALKER USER, BRANCH OR DEALER

WALKER VEHICLE COMPANY

America's Leading Manufacturer of Electric Trucks and Tractors

NEW YORK CHICAGO BOSTON

LOWEST-TRUCKING-COST

Pressed Steel Frames

The largest and best equipped Frame plant in the world

A.O. SMITH CORPORATION

MILWAUKEE

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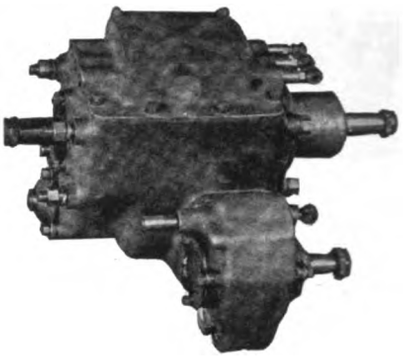
FULLER TRANSMISSIONS



The call is more and more insistent for trucks equipped with means of utilizing the engine power to operate dump bodies, hoists, winches, etc.

The truck equipped with Fuller transmission can answer that call, as a Fuller Power Take-Off may be attached to Fuller Transmissions and also a tire pump may be attached for the pneumatic equipped truck.

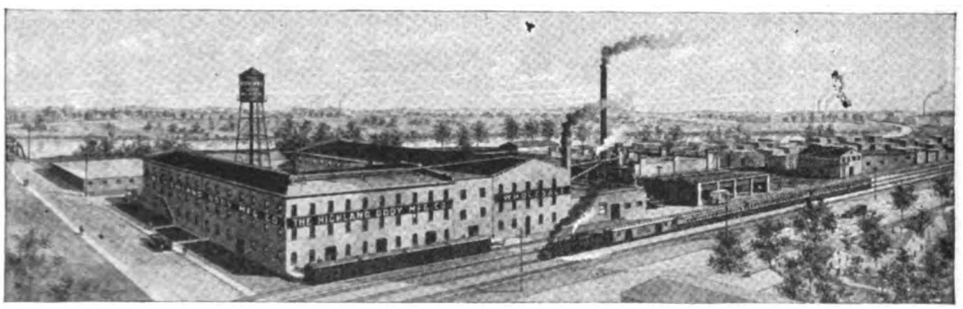
Manufacturers of transmissions, clutches, and controls exclusively.

FULLER & SONS MFG. CO.

KALAMAZOO, MICHIGAN

Kresge Building, Detroit, Mich. American Circle Building, New York, N. Y. Rialto Building, San Francisco, Calif.

HIGHLAND STANDARD BODIES AND CABS



THE HIGHLAND BODY MFG., CO.

CINCINNATI OHIO

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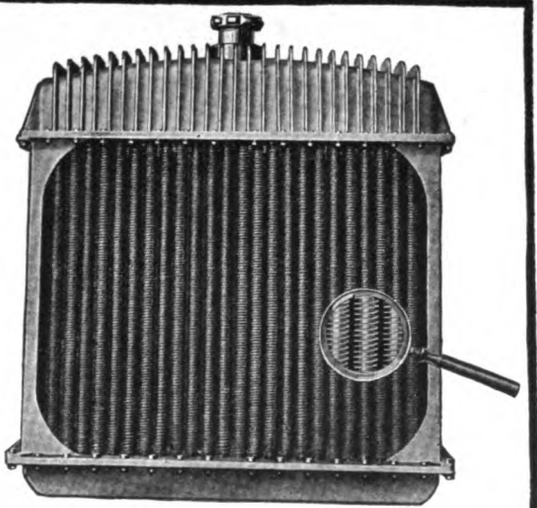
Winther Trucks

A complete line of quality trucks nationally known and appreciated.

Immediate Deliveries

Winther Motor Truck Co.
Kenosha, Wis.

RADIATOR INSURANCE



GUARANTEED FOR THE LIFE OF THE TRUCK

These Seamless Helical Tube Cooling Sections are perpetual insurance against radiator trouble.

Write for complete information.

Rome-Turney Radiator Co.
Rome, New York, U. S. A.

Cut Out the Waste!

WASTE of Lubricating oil is reduced to a minimum by the BOWSER portable oil measuring tank.

Loss of the lubricating value of oil is prevented by keeping it pure and clean.

The power of the motor is conserved.

The life of the motor is prolonged and haulage costs are reduced.

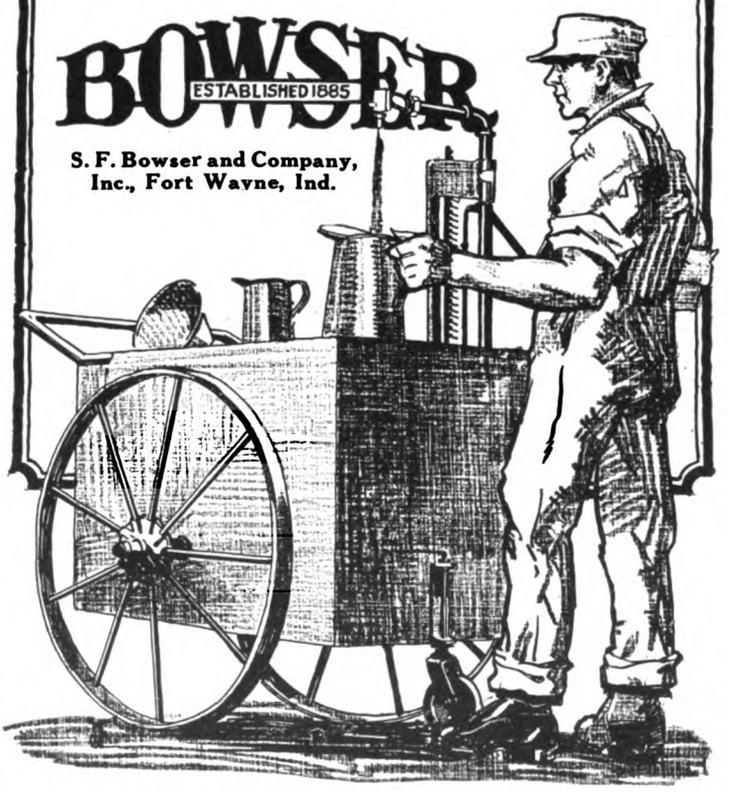
Operating economy is directly dependent upon the use of motor oils of known lubricating value, protected against the introduction of foreign matter and supplied in exact quantity.

Such service is possible with a BOWSER.

We Will Gladly Recommend the Units Most Economical for Your Use.

BOWSER ESTABLISHED 1885

S. F. Bowser and Company, Inc., Fort Wayne, Ind.



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A Grease Gun on Every Bearing

Not one that must be attached every time grease is needed

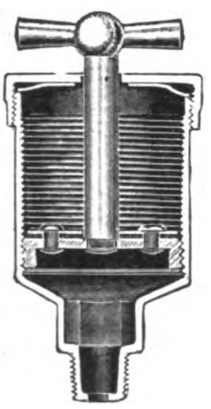
—but one that remains on the bearing without refilling for 15 to 35 greasings—

depending upon the size used and the part to be lubricated.

EMPRESS Plunger Feed Grease Cup No. 214

does the work of a grease gun or similar device more affectively, readily and easily. Simply fill and attach, giving the handle one-half turn when grease is needed. Seldom necessary to get under the car, the handle is usually within reach, but for cases where it cannot readily be reached extension nipples can be used.

No. 214 Marine Leather Packed Grease Cup



TESTED UP TO 1000 POUNDS PRESSURE WITHOUT LEAKING

Drawn from rolled sheet metal, these cups combine lightness with strength, they are built to withstand the roughest kind of service. Fitted with a locking device, the cap is effectively prevented from jarring loose, it locks at every quarter turn, not effected by vibration. Made from brass and steel, in five sizes and in several finishes. The leather packing on the plunger insures an even pressure at all points and prevents leakage.

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CANADIAN FACTORY—CANADIAN WINKLEY CO., LTD., WINDSOR, ONT.

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Write right away for illustrated details of the E & W TRAILER, the reputation-making trailer, the non-swaying, non-shaking, RADIUS ROD, true track TRAILER. Get your inquiry in the mail now.

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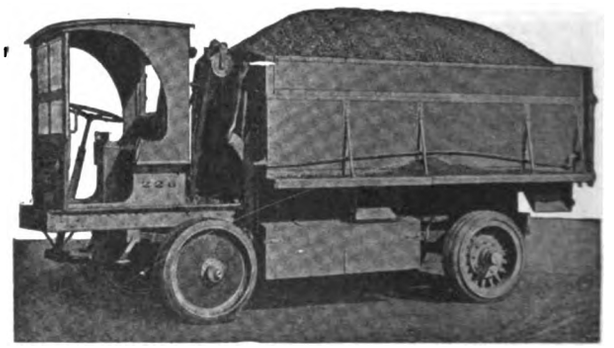

Front or Four-Wheel Drive Trucks and Tractors

Conservation is the key to success. ***Couple-Gear*** is the method, saves men and horses. Derives its propelling force from water flowage. The ***best*** is the ***cheapest.***

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Pierce-Arrow trucks are still running after 8 years.

This extraordinary record is absolutely unique in motor truck experience. It can be duplicated by no other truck made.

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deliver more work in a given time;
lose less time on the job and off the job;
cost less to operate and less to maintain;
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Apply its lessons to your truck problem.

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Quick Sales

Says Walter Michler

MR. WALTER MICHLER of Fond du Lac, Wisconsin, sold over 100 sets of Giant Grip Traction Equipment in the last four months with very little effort.

He simply told truck owners they could get 100% efficiency from trucks in any weather and under any road conditions with Giant Grips.

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One style Giant Grip fits over 400 makes of trucks.

Giant Grip Traction Equipment consists of clamps permanently attached to the wheels, and of chains and hooks carried in the tool box when not in use. Two minutes to apply or remove them. No tools—no jacking up the wheels.

Dept. 25

CHALLONER COMPANY *Established 1863* **OSHKOSH, WISCONSIN**

Giant Grip

Traction Equipment for Motor Trucks

LEE LINE

Trailers—Bodies—Loaders

Automatic Side Dump Bodies

Choice between side and end dump motor truck body perhaps cannot be reduced to a mathematical formula, but, nevertheless is based upon desired results under given conditions.

Most contractors find the automatic side dump body especially suited to their needs. Maneuvering on a crowded street, generally between piles of brick, lumber, stone and other construction material, the advantage of dumping a load off the side, clear of the roadway, is apparent.

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Builders of Automotive Auxiliary Equipment

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MUTUAL

"America's Greatest" TRUCK

attracted marked attention at the Chicago Truck Show

of the hundreds of trucks exhibited there, **not one** embodied as complete an array of **super-specifications** as were shown in the Mutual.

It was a matter of comment that the more truck-wise a visitor was, the longer he stayed at the Mutual exhibit, and the more thoroughly he posted-up on its every detail.

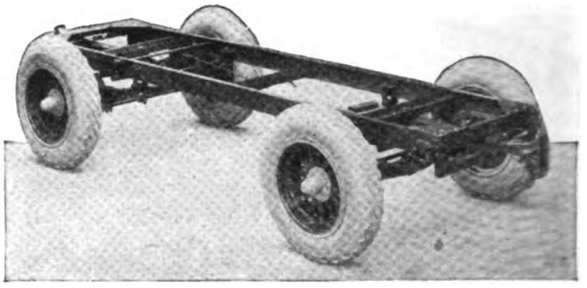
The Mutual Truck is built in 2 ton, 3 ton and 5 ton units, solid tires and 2½, 3½ and 6 ton pneumatics.

Send for our Folder

Mutual Truck Company

Sullivan - - - Indiana

U. S. A.



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Four Wheels—1, 2, 3½ and 5 tons
Semi-Trailers—2, 4 and 6 tons
Log and Pole Trailers—2, 4 and 6 tons

You can no longer figure your customer's transportation problems without giving consideration to trailers. Arcadia Trailers are built to meet this need.

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Get after the Side-Dump Body Business and increase the output of Trucks.

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AUTOMATIC SIDE-DUMP BODY

To increase the Sales of Trucks put on a Side Dump Body and Watch your Business Grow.

Dumps in any weather.
Will outwear any truck.
No lost space back driver's seat.
Can't break down and get out of order.
Dumps a 3 yard load in a minute and a half.
Dumps all the load off without operating Truck.

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are the HEART of Universal Joint Service. Over-sized bearings, positively lubricated by a thorough oil distribution, as well as the many other salient qualities incorporated in our new Model B Joints, account for the instant recognition accorded them by discriminating engineers.

The Model B Universal Joint withstands every gruelling subjection under full guarantee.

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"Pioneer Builders of Universal Joints"

ALLEGAN **MICHIGAN**

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Let us Prove to You that

OSHKOSH

4-wheel-drive-truck

hauls a capacity load at greater speed on less gas, than other two ton trucks.

The Oshkosh 4-Wheel Drive attains practically 100% transmission of motor power to the four wheels, all of which are driving wheels—front ones pulling and rear ones pushing.

In this truck there is virtually no power loss due to road slippage, whereas with the two-wheel drive the average loss, even on good roads, is 20%.

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Oshkosh, Wisconsin

The K. & L.

EFFICIENT and DURABLE RADIATORS

The ACE of Radiators

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Send for samples and report on preliminary tests—then send us your B-P's and engine data and let us prescribe for your particular wants and give you our quotations.

We manufacture all sizes and shapes of cores for all purposes. We also build all styles of complete radiators.

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Worm Drive

2½, 3½, 5 Tons

Sanford Trucks

Model W-25. Capacity two and one half tons. Bought by the Security Fireproof Storage Warehouse, Wilmington, Del.

Protection and Promptness

In the delivery of furniture and other household articles of value, the owner seeks not alone promptness and dispatch, but absolute protection to goods in transit.

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Heil's 4 in 1 Combination Body and Hydro Hoist (Hydro Dumping Equipment) increases the earning power of any truck. You will be interested in this equipment because it can be converted into a coal, gravel, or platform body by removing the sides. Its efficiency is increased by the Hydro Hoist, which utilizes all the loading space and gives proper load distribution.

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DURSTON

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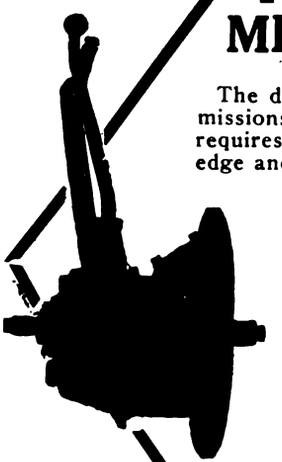

The designing of transmissions is an art that requires expert knowledge and long experience.

The building of transmissions calls for the best of materials and the most careful workmanship procurable.

DURSTON Transmissions fulfill every requirement—they have stood the supreme test of hard service for many years.

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N. Y.

Write for data on our new Unit Power Plant Transmission for 1½ and 3 ton trucks.

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FOR giving maximum mileage and the greatest measure of protection to loaded trucks, Fisk Truck Tires are unsurpassed.

They save money for you.

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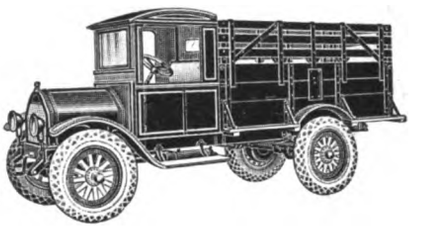
The Luverne Farm Truck

Capacity Two Tons

PRICE $1800.00

Including Electric Starter and Lights, Semi-Enclosed Cab and Combination Grain and Stock Body



These trucks have been on the market for over three years, during which they have fully proven their ability to meet the requirements of the **Farm Trade** in a superior manner.

Ask for our Dealers' Proposition

LUVERNE MOTOR TRUCK COMPANY

LUVERNE MINNESOTA

STATEMENT OF THE OWNERSHIP, MANAGEMENT, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST, 24, 1912

Of The Power Wagon, published monthly at Chicago, Ill., April 1st., 1920.

State of Illinois, County of Cook—ss.

Before me, a Notary Public in and for the state and county aforesaid, personally appeared Stanley A. Phillips, who, having been duly sworn according to law, deposes and says that he is the Editor of The Power Wagon, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in Section 443, Postal Laws and Regulations, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers, are:
Publisher, The Power Wagon Publishing Co., 544 Lake Shore Drive, Chicago, Ill.
Editor, S. A. Phillips, 544 Lake Shore Drive, Chicago, Ill.
Managing Editor, none.
Business Manager, none.

2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock.)
The Power Wagon Publishing Company.
Walter Wardrop, 544 Lake Shore Drive, Chicago, Ill.
S. A. Phillips, 544 Lake Shore Drive, Chicago, Ill.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.)
None.

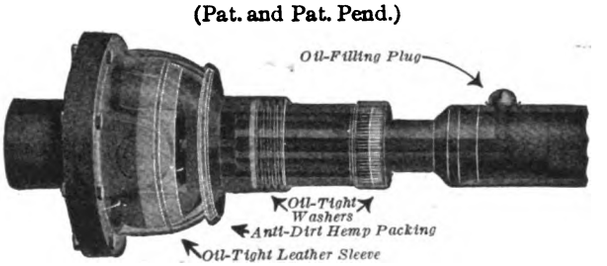
4. That the two paragraphs next above, giving the names of owners, stockholders, and security holders, if any, contain not only the list of stockholders, and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders, who do appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest, direct or indirect, in the said stock, bonds or other securities than as so stated by him.

STANLEY A. PHILLIPS, Editor

Sworn to and subscribed before me this 27th Day of March, 1920.
(SEAL)

JOSEPH SOLARI, Notary Public.
(My commission expires May 26, 1923).

"M & E" Universal Joint
(Pat. and Pat. Pend.)



For Oil Lubrication

IT IS always a laborious task to fill Universal Joints with grease; and it is difficult to keep all working parts well lubricated.

The "M & E" Oil-Tight Universal Joint eliminates lubrication obstacles, as only worm oil is required. See illustration for details.

Under speed tests at different angles, and in all temperatures, "M & E" Universal Joints have operated without leakage or injury to Oil-Tight sleeve.

MERCHANT & EVANS Co

NEW YORK PHILADELPHIA WHEELING
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Cast Steel Wheels

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Any Make of Axle
Any Make of Tire

Specify West Cast Steel Wheels
On Your Next Truck Order

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Cleveland, Ohio

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"Watch the WEST STEEL WHEELS Go 'Round"

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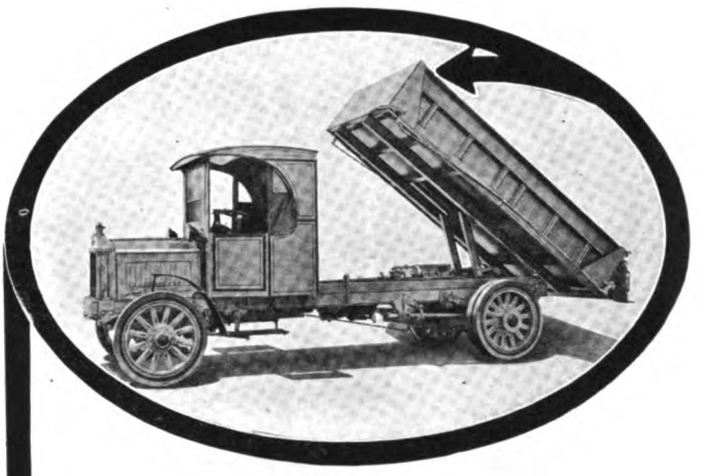

A Dumping Unit that Saves the Truck--

Here is a Dumping Unit that does not jerk or strain the chassis. The **full-length** body rolls up to its high dumping angle—the load is instantly discharged—the truck is on its way without a moment's loss of time.

For Dealers Who Want to Build Bigger Business--

We have a sales message for such dealers—a proposition that means more profits and permanent business.

Write for Bulletin W-18

HORIZONTAL HYDRAULIC HOIST CO.

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Sales and Service Stations

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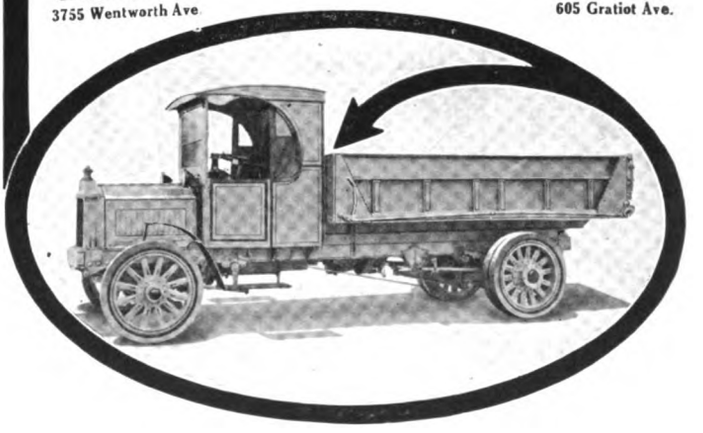

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SINCLAIR OILS
WIN AGAIN

JIMMY MURPHY driving a Duesenberg Special, won the Los Angeles Speedway 250 Mile Race without a stop during the entire run, thus establishing the Non-Stop record. He averaged 103 miles per hour.

Jimmy Murphy used

SINCLAIR MOTOR OIL
SINCLAIR GASOLINE
and
SINCLAIR SHAMROCK
LUBRICANT

SINCLAIR REFINING CO., CHICAGO

Atlanta	Denver	Louisville	Omaha
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Please mention "Power Wagon" when writing to advertisers.

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Roller Type

"WHITNEY" CHAINS

Equip Your Motor Trucks and Tractors with "Whitney" Chains

Now that the motor truck is handling so much of the freight that was formerly cared for by the railroads, it must run on a schedule almost as exacting as that of the railroad train itself. This emphasizes the necessity of selecting a chain which can be relied on under all conditions of speed, road and weather.

Silent Type

THE WHITNEY MFG. CO.

HARTFORD, CONN.

Chains **Keys and Cutters** **Hand Milling Machines**

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Stewart

MOTOR TRUCKS

Here's the proof:

Fleets that grew from one

It isn't the *size* of a truck fleet that tells the real story. A big industry that decides to motorize may buy 20 to 50 trucks at once—may make a mistake of judgment that will never be discovered. But the business man who buys one truck, finds it pays big, has to buy another and still others to keep up with expansion — his experience is a valuable guide.

Stewart dealers can tell you of numerous cases, right in your own vicinity, where the first Stewart expanded gradually into a large fleet, and every truck that was added was another Stewart.

Each Stewart fleet tells a complete story of the service, efficiency and economy of Stewart trucks—a story that has gone around the world—for Stewarts are giving everyday satisfaction in 700 American cities, on hundreds of farms and in 38 foreign countries. And only through this satisfaction of owners could the Stewart Corporation have become one of the world's leaders in truck building in only 7 years.

Read what these fleet owners say:

HENRY J. BALL,

MILWAUKEE, WIS.

We are using at the present time twenty-six Stewart trucks from one ton to three-and-one-half ton capacity. This explains how we like them. We are more than satisfied and we expect to buy more in the near future. When we began buying trucks we had several different makes, but are so well satisfied with the Stewart trucks that we are now standardizing on them.

(*Signed*) HENRY J. BALL

ROTHENBERG & CO.

W. 14TH ST., NEW YORK CITY

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(*Signed*) LEO A. PRICE, Pres.

Have bought more since writing above.)

Model 11—¾-Ton Capacity—Chassis $1350
Electric starter, electric lights, magneto ignition

Model 12—2000 lb Capacity—Chassis $1655 with electric starter, electric lights, magneto ignition and five-inch pneumatic cord tires.

Model 9—1½-Ton Capacity—Chassis $2250

Model 7—2-Ton Capacity—Chassis $2875

Model 10—3½-Ton Capacity—Chassis $3895

All prices f. o. b. Buffalo

Stewart Motor Corporation, Buffalo

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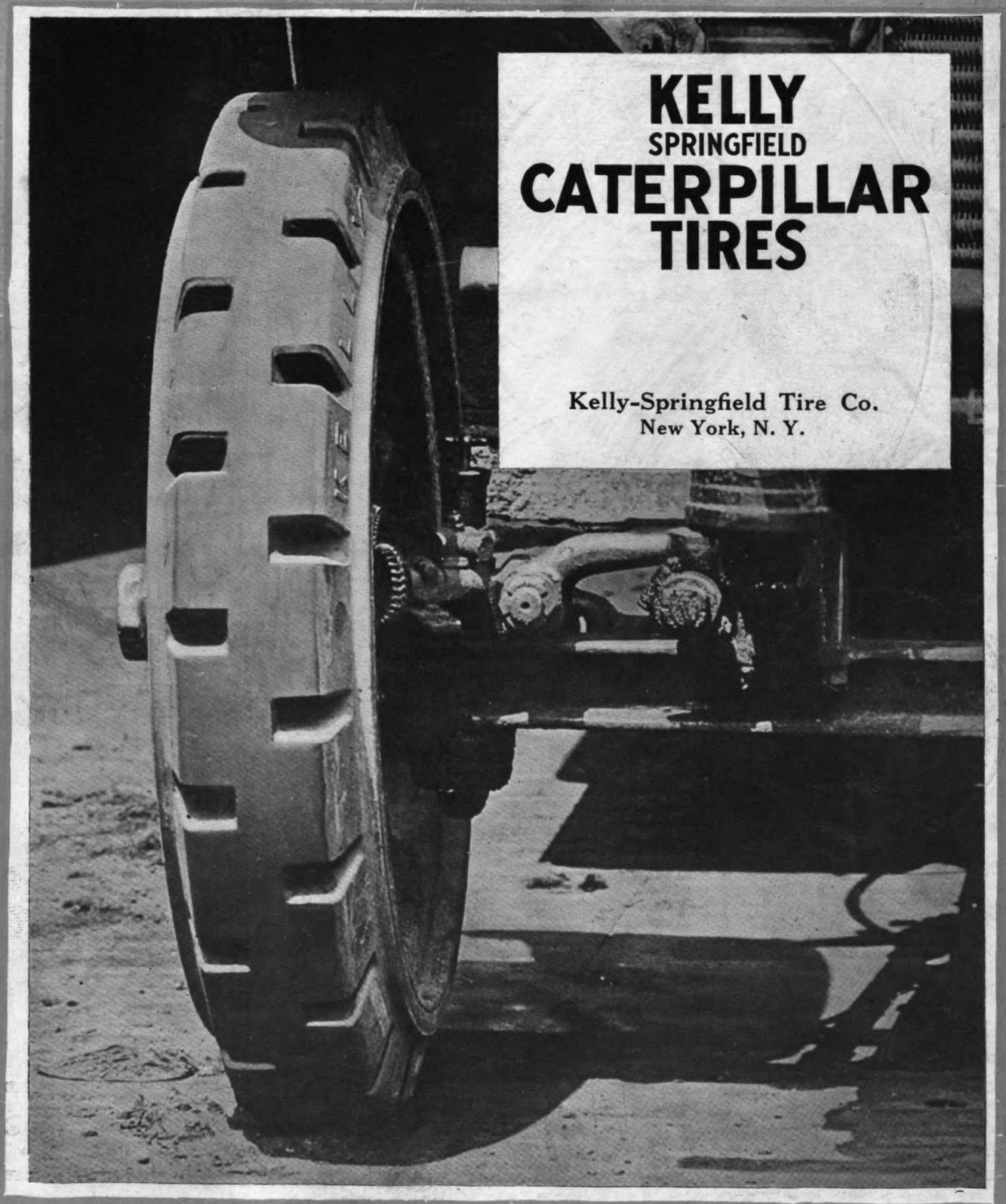
POWER WAGON

Number 186 CHICAGO, MAY, 1920 Price 50 Cents



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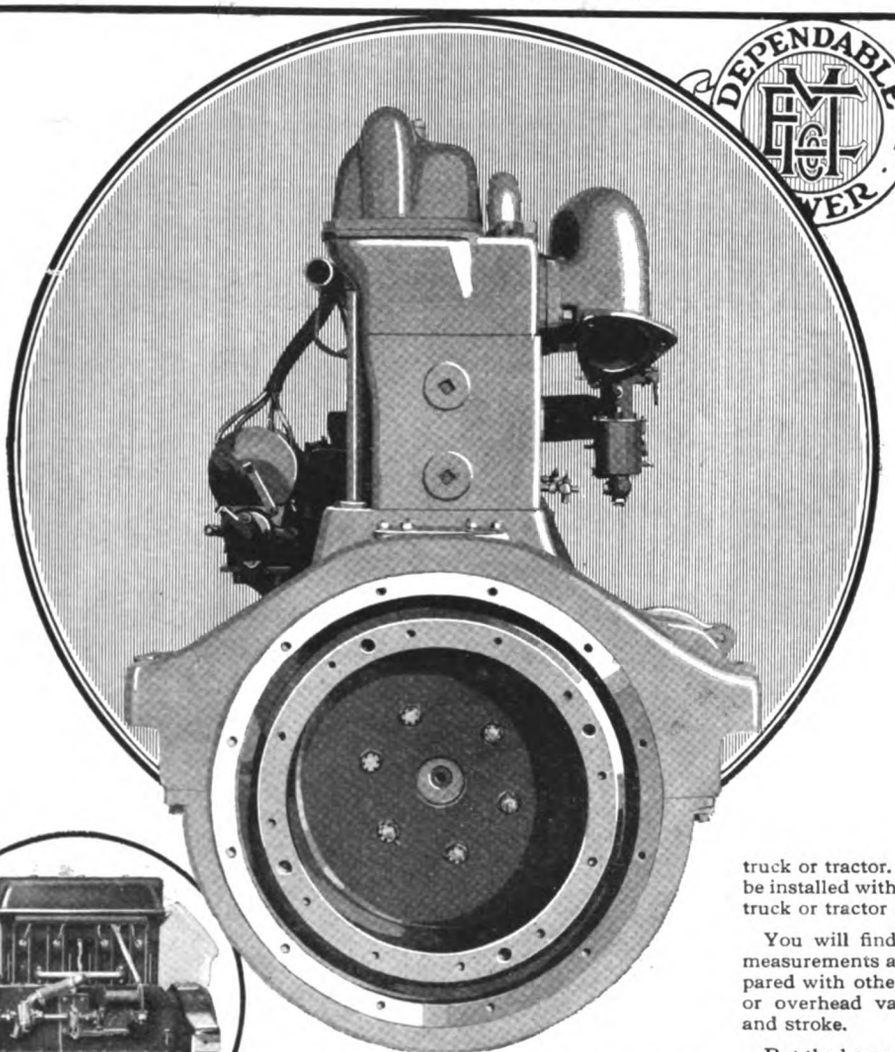
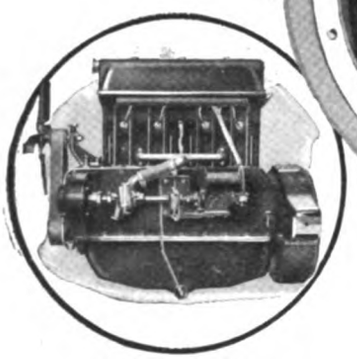
MIDWEST

TRUCK *and* TRACTOR ENGINE





Midwest 3 point suspension Truck and Tractor engine, valve-in-head type, bore 4½", stroke 6"

There are features of superiority in the Midwest Truck and Tractor Engine that, from a manufacturing and selling standpoint, merit the favorable consideration of every truck and tractor manufacturer.

You are undoubtedly familiar by this time with the superior *sales* features—such as the 3" whip-proof crankshaft—lubrication by volume under pressure, instead of once each revolution—oil volume regulated according to *load on*, instead of speed of, engine, and other features never before incorporated in one engine.

Now consider for a moment some of the manufacturing features as applied to your truck or tractor. The Midwest engine can be installed without radical changes in your truck or tractor design.

You will find the principal installation measurements are standardized when compared with other engines (either "L", "T" or overhead valve types) of similar bore and stroke.

But the horse power and torque are greater than in any other engine of the same bore and stroke with which we are familiar. This extra power and pulling ability under the hood of your truck or tractor is supplied without added cost or manufacturing difficulties to you.

May we supply you with additional proof of the manufacturing superiority of this engine?

Some open capacity available on 4½ x 6" and 4⅛ x 5¼" sizes. Either size supplied with No. 2 or 3 S. A. E. bell-housing, or in the open fly wheel type.

Please address sales division 16.

MIDWEST ENGINE COMPANY---Indianapolis, U. S. A.

Dependable Power

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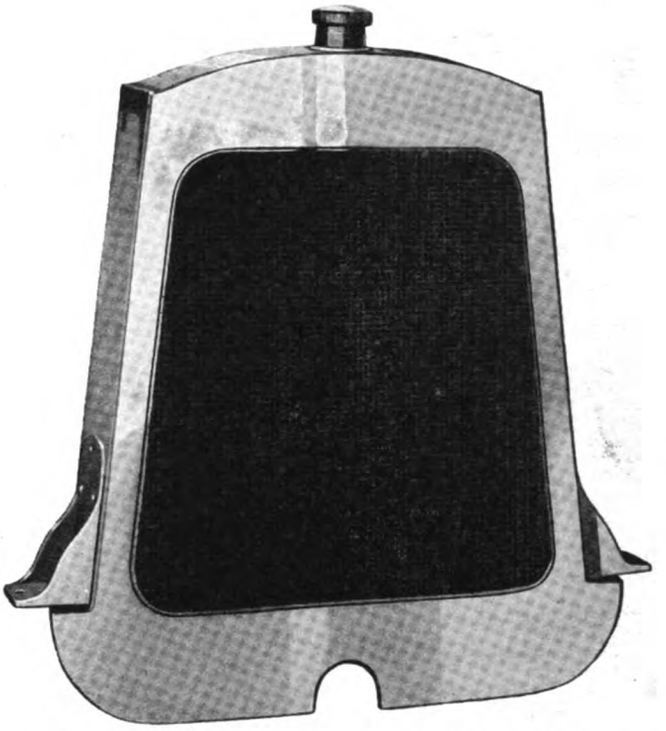

Every Long Cooling System is scientifically adapted to the particular engine which it serves, thereby assuring the maximum of cooling efficiency

The Kinship of Years and Efficiency

In the span of a human life, *18 years* are but the attainment of youth, but "18 years" when associated with an institution of foremost rank in the *automotive* industry—this titanic prodigy of commerce—signify the purposefulness and fullness of maturity, the wisdom and resourcefulness of ripened knowledge and experience; the enthronement of an *ideal.*

Such are our years; these are their fulfillment—strength combined with judgment; fitness united with deliberation; desire associated with capability; success expressive of *merit.*

And these—in unstinted measure—are at your service.

No engine can be more efficient than its cooling system.

The Long Cooling System guarantees the accomplishment of maximum efficiency at minimum cost

LONG MANUFACTURING CO., DETROIT, MICHIGAN

Pioneer Makers of Cooling Systems for Gasoline Engines

LONG
COOLING SYSTEMS

The Recognized Standard for Tractor, Trucks and Motor Cars.

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"NORMA"
PRECISION
BALL BEARINGS
(PATENTED)

THE majority may not always rule—but its concerted judgment is quite apt to be correct. By far the great majority of high-grade magnetos and lighting generators are "NORMA" equipped. Which indicates a striking unanimity of opinion among manufacturers who place serviceability before price. And the performance of their machines justifies their judgment in standardizing on "NORMA" Bearings.

See that your electrical apparatus is "NORMA" equipped.

THE NORMA COMPANY OF AMERICA
Anable Avenue
Long Island City
New York

Ball, Roller, Thrust and Combination Bearings

POWER WAGON

An exponent of the most enlightened thought and practice of the motor truck industry.

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THE POWER WAGON PUBLISHING COMPANY
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ROSS STEERING GEARS

Easy Steering Increases Efficiency, Reduces Delivery Costs, Makes Satisfied Owners

The real efficiency of a motor truck depends very largely upon the ease with which it can be handled. This is one of the most vital of all considerations for the man who buys a truck, or for the manufacturer or dealer who sells it. Ease of handling, in turn, depends essentially upon the steering gear with which it is controlled.

Ross Steering Gears, with their enormous bearing surfaces, mean an easier day's work for the driver, and at the same time a bigger return to the employer in greater service from both the truck and the man who drives it. This increased efficiency reduces delivery costs and makes satisfied owners.

In order to insure their customers of the easy steering, the safety and the reliability which Ross Steering Gears guarantee, 166 motor truck manufacturers are now using them as standard equipment. They know that Ross Steering Gears mean contented drivers and satisfied owners.

Write for any further information desired

ROSS GEAR & TOOL COMPANY
780 HEATH STREET, LAFAYETTE, INDIANA, U. S. A.

The Steering Gears that Predominate on Motor Trucks

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The Whole World Understands This Language

THE slant-eyed Oriental selling trucks in China, the Brazilian coffee merchant operating his fleet of trucks in Sao Paulo, the dusky native driving a truck loaded with wheat to the Algiers wharf—each speaks a different language. Their modes of living vary.

But there is one thing they have in common and that is appreciation of mechanical excellence. This is the one universal language, requiring no translation from one tongue to another.

In every climate, in every business, the mechanical excellence of Clydesdale trucks has become proverbial. This is why Clydesdales can be found in 35 different countries scattered all over the world.

The records made by thousands of Clydesdales operating under conditions varying from the biting cold of Alaska to the burning heat of Java have substantiated this world-wide appreciation of Clydesdale's mechanical excellence.

No Other Truck Has It

"The Driver under the Hood"

The Clydesdale Automatic Controller

One to Five Tons Net Load

THE CLYDESDALE MOTOR TRUCK COMPANY
CLYDE, OHIO

CLYDESDALE
A World Proven Motor Truck

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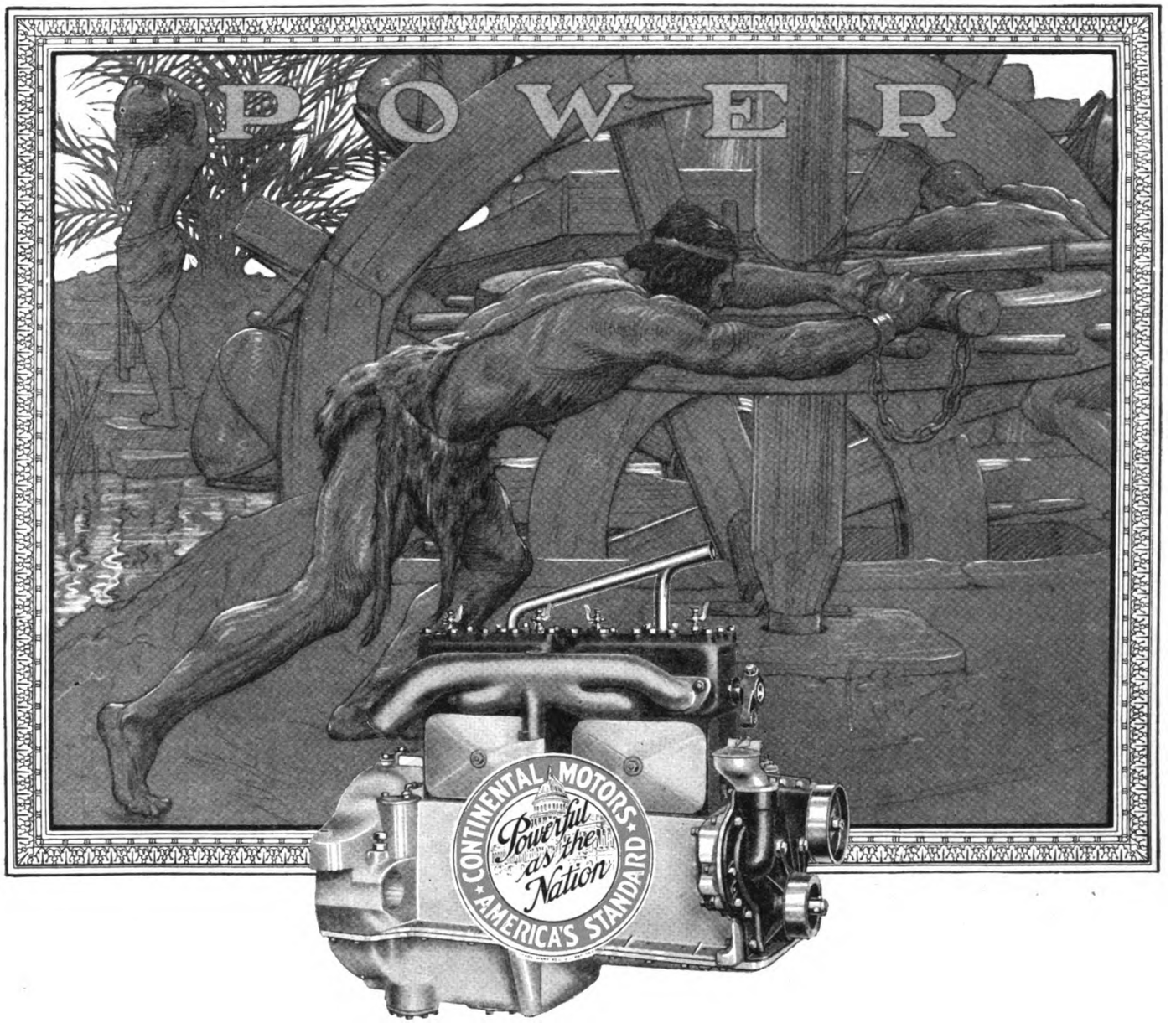

Progress cannot halt and still be called Progress. It moves only in one direction — ahead. ¶ It is gratifying to the makers of Continental Motors to know that the year-by-year development of their products has kept pace with the on-rush of the industry. ¶ It is gratifying to know that the Continental organization has steadfastly requited its obligations to those who made the motor of today possible. ¶ It is gratifying to realize that its present day products are representative of the unvarying quality that for years the world has looked for under the Continental Red Seal.

CONTINENTAL MOTORS CORPORATION

Offices: Detroit, U. S. A. Factories: Detroit and Muskegon

Largest Exclusive Motor Manufacturers in the World

Continental Motors

STANDARD POWER FOR AUTOMOBILES, TRUCKS AND TRACTORS

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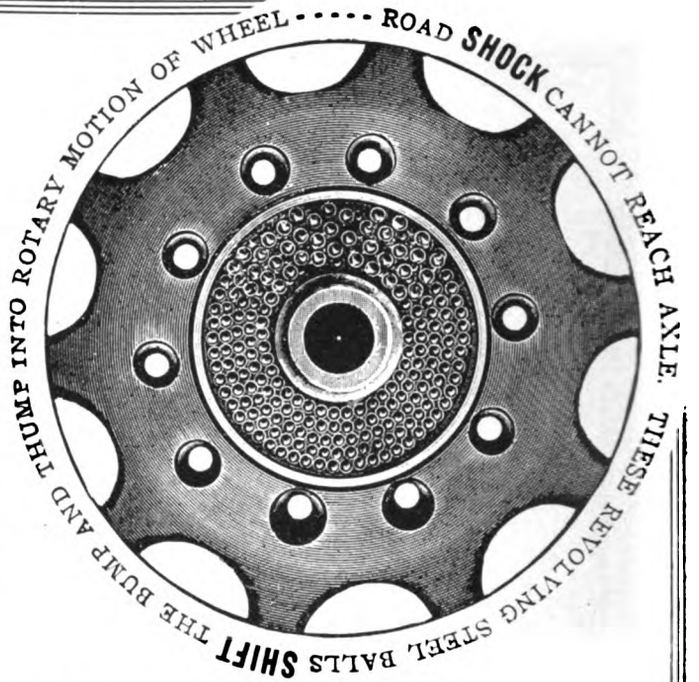
SHOCK SHIFTER



American Patent No. 889,951 is now offered.

In the English High Court of Justice the "general and exceptional utility" of this invention has just been carefully sifted by the representatives of the Crown. The patents have therefore been upheld and a quite unusual prolongation granted.

The eminent British vehicle and road experts were examined, including:—

Colonel Crompton, Commander of the Bath, Advisory Engineer of the Road Board, President of the Commercial Motor Vehicle Users' Association (representing practically all those using commercial motor vehicles in the United Kingdom) and President of the Institute of Electrical Engineers, who gave evidence after his numerous road tests, that there could be no question of the importance of the device for economy of road construction and economy of road maintenance. In the case of touring cars he found that it rendered solid tires "just as good as very good pneumatic tires". He found a large saving in all running costs of any motor vehicle.

General F. Searle, managing director of the Daimler Company, gave evidence of his twelve months' close observation of the third test of the invention on the motor 'buses of the London General Omnibus Company—the largest users of motor traction in the world—while he was their chief engineer. He stated "that the 'Shock Shifter' was the only appliance which had ever been satisfactory, so far as springing was concerned". It gave "every satisfaction".

Major Sharp, of the Motor Transport Service, deponed to having run a heavy touring car seated for nine thousands of miles at speeds up to 50 miles an hour, on rough roads, on solid tires with this device with every comfort and with no damage.

Mr. James Swinburne, the eminent scientific expert, explained that there was a principle not hitherto applied to mechanics disclosed by this invention. "It is not a resilient hub; it is a non-resilient hub. It is an invention of exceptional originality and, I think, of exceptonal merit".

The attorney general then conveyed to the Court that he had become so satisfied as to the "general and exceptional utility" of the device, that he withdrew all reference to all other patented efforts, and all opposition of the Crown.

The learned judge, after commenting on the invention as a very "striking one", enabling solid tires to be used in place of pneumatics and upon the consequent great advantage to the community, and in also saving the wear and tear on roads, summed up: "Bearing in mind the general utility and extreme ingenuity of the device, I shall not be exceeding the proper bounds if I say that the Letters Patent should be extended for a term of seven years".

This "fluid steel ring" of balls all but fills the hub. They make a "clean cut" of vibration away from the axle. Road Shock is converted, on annular ring, into rotary motion—the essential function of the wheel. The whole load, including dead weight of chassis, axles, wheels, etc., is rendered far more mobile than is at all possible by any reacting springs, and at the right place—the axle foundation —mark that.

The certified saving of gear oil is 20% (significant fact), of fuel 12½%, of lubricating oils 6%, to say nothing of the saving of tire and repair bills. The "Scientific American" states that 45% of the running costs of motor vehicles is due to vibration. Think of that! This waste is aptly described as "an economic crime".

Mr. J. B. Dunlop, the inventor of the pneumatic tire, writes: "If I could have found a suitable material, capable of being bent continuously backward and forward for a reasonable length of time, without becoming fatigued, a pneumatic tire in all probability would never have been invented." Here you have it.

After years of wear, those "shock shifter" wheels are found remarkably sound mechanically; more so than any rigid wheel. They can be inspected now, or conviction of the truth of the claims made realized, by a ride on a motor 'bus in London—a most crucial test. They can be seen on sets of stiffly sprung shattered war trucks, back from the war zone, but now freed from vibration and in transport service.

Apply to inventor's firm:

JOHN MUIR & SON, 3, Arundel Street, Strand, London, W. C. 2, England.

This revolutionary invention offers economic control of the industry now to competent American firms, or firm.

Better use cable address:—"Letters Estrand London".

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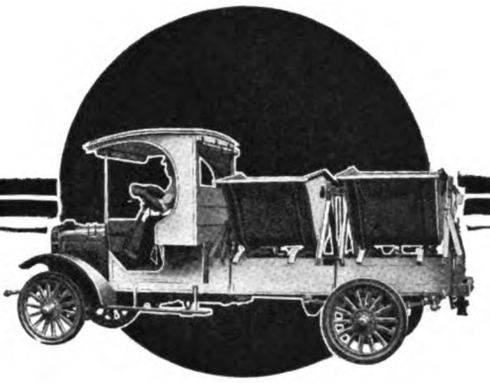

Expert Evidence -

It is significant that in the automotive industry, where the selection of a motor truck is on a scientific basis, *SERVICE* Motor Trucks are widely used.

You will find listed below a few of the *SERVICE* owners in the automotive industry—firms who are in a position to *know* that *SERVICE* Trucks will meet their utmost requirements.

To the prospective dealer—to *you*—the judgment of such concerns should prove of material assistance in selecting the truck that will best enable you to build up a profitable business in your community.

Apperson Bros. Auto Co.	Hood Tire Co.
Auburn Automotive Co.	Midwest Engine Co.
Auburn Foundry	Millholland Machine Co.
Buda Co.	Portland Forge & Foundry Co.
Danville Malleable Iron Co.	Robert Hassler, Inc.
DuQuense Steel Foundry	Seagrave Co.
Firestone Tire & Rubber Co.	Standard Welding Co.
Fuller & Son Mfg. Co.	Timken-Detroit Axle Co.
Goodyear Tire & Rubber Co.	Savage Arms Corp.

And remember this—*SERVICE* dealers are assured a permanent future, not only by the financial integrity of the Service Company, but by the great public good will *SERVICE* Trucks have established throughout the past ten years. 68% of all *SERVICE* Trucks are sold on repeat orders.

SERVICE Trucks are built in 80 different combinations, of power, speed and capacity, from which to offer the purchaser the one best suited to his requirements. Communicate with us at once, stating the territory you desire. Complete facilities for export trade.

SERVICE MOTOR TRUCK CO., Wabash, Ind., U.S.A.

NEW YORK—87-89 West End Ave. CHICAGO—2617-25 So. Wabash Ave.

Service
MOTOR TRUCKS
Builders of Business

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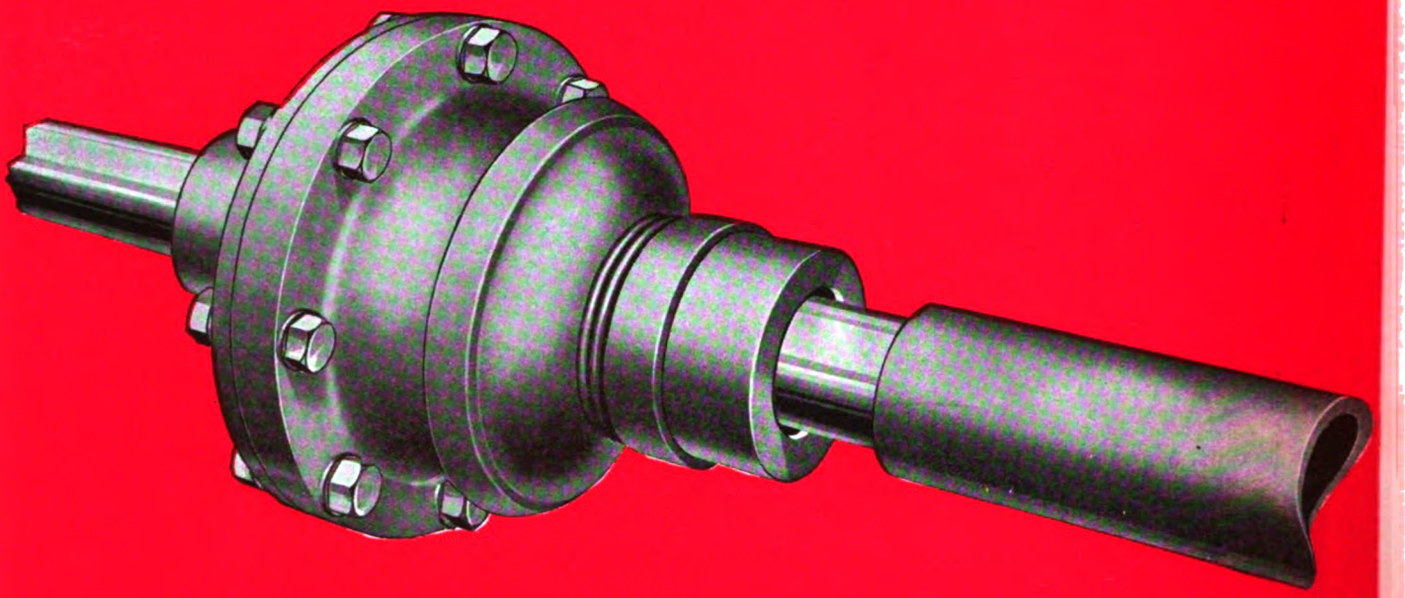

Stronger, More Compact and Flexible Positive Lubrication, No Leakage

NO one member in the Pick Universal Joint bears the brunt. Strains are distributed to all members by the equalizing action of the joint. And the bearing area, greater than in any other joint, gives lowest bearing pressure per square inch.

The Pick Universal Joint is 2 inches more compact than other metal universals. Strains therefore are applied where construction and resistance are strongest—*not* outside the center of strength.

Its segments and blocks bear directly on each other, and so take *twisting* as easily as sliding movements. Thus there is free motion in every direction. The strain caused by speed fluctuations is overcome because of the free action of segments and bearings.

Centrifugal force throws the lubricant *out toward* the moving members. By their action on each other, these are positively lubricated. A series of steel stampings retains the lubricant in the housing *without leakage*.

Because of its greater strength, compactness, flexibility and positive lubrication the PICK is totally superior to any other universal.

Automotive manufacturers, engineers and production managers are invited to write for fully informative Blue Print Portfolio.

MANUFACTURED BY

CARL PICK COMPANY, WEST BEND WISCONSIN, U. S. A.

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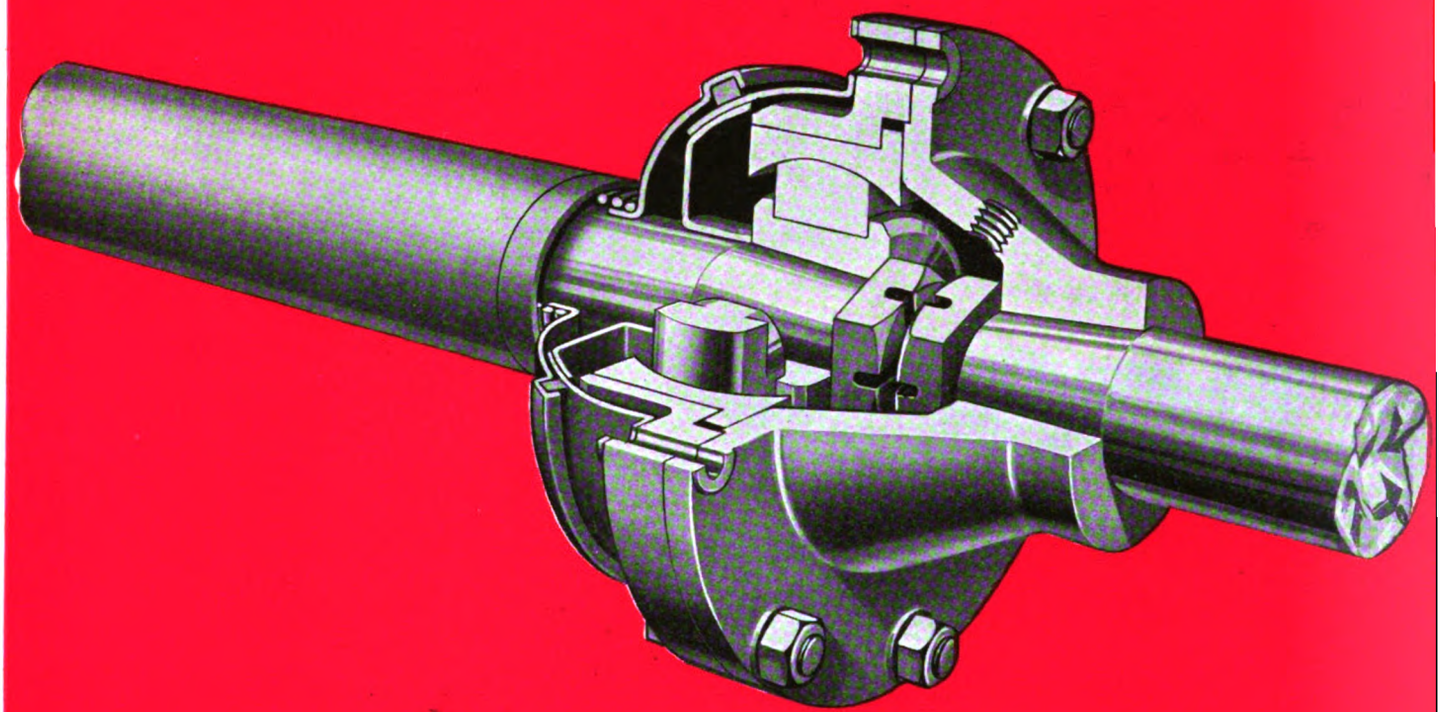
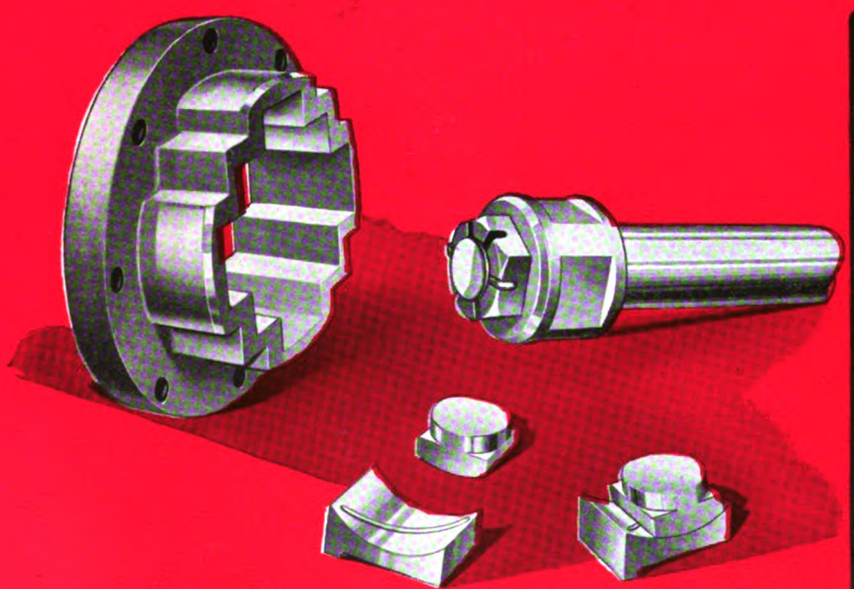
Pick
UNIVERSAL JOINT





Note Construction

TUBULAR drive shaft is held between four segments. These in turn rest on four bearings, the arcs of which form a circle. Segments and bearings are free to slide and twist in every direction within the block which holds them. A series of steel stampings retains the lubricant. Parts are held in position by eight bolts extending through the housing and flanges.

WRITE FOR BLUE PRINT PORTFOLIO

Please mention "Power Wagon" when writing to advertisers.

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BOSCH

Get This Selling Edge on Your Competitors

It is an established fact that Magneto Ignition is the only practical ignition for motor trucks.

The dealer whose truck uses the magneto which is best known, most dependable, best advertised and best served in the field has a great selling edge on his competitors.

Putting Bosch Ignition on the truck you sell identifies it as a quality job and makes your selling easier.

Some of your customers know other ignition systems, but everyone knows that Bosch is "America's Supreme Ignition System."

You can have this selling edge if you insist upon **your trucks coming through Bosch Equipt; write it in on every order.**

300 Service Stations in 300 Centers

AMERICAN BOSCH MAGNETO CORPORATION

Main Office and Works: **Springfield, Mass.**
Branches: **New York, Chicago, Detroit, San Francisco**

Be Satisfied
Specify Bosch

AMERICA'S SUPREME IGNITION SYSTEM

MOTOR TRUCKS – TRACTORS – AIRPLANES – MOTOR CARS – MOTOR BOATS – MOTORCYCLES – GAS ENGINES – ETC.

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General Motors Trucks

NO more opportune time ever presented itself for marketing motor trucks.

During the past few years the demand for trucks has been surprising; it is now overwhelming; and what the future holds may be gauged by the past and the present.

All the forces of industry seem to center about transportation, and motor trucks have a most promising place in the picture.

To be a motor truck dealer and to be connected with a manufacturer whose permanency is assured is a fortunate position in the automotive industry.

A GMC dealer is in that position. Behind him is the prestige of a great name, a sound institution and a genuinely good product.

Co-operating with a GMC dealer are highly organized sales and service departments and nation-wide advertising.

If you are not in the ranks of General Motors Truck representatives and would like to know more about the GMC proposition, just write.

GENERAL MOTORS TRUCK COMPANY

One of the Units of the General Motors Corporation

PONTIAC, MICH., U. S. A.

(650)

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DELIVERIES

At this time when the country is truck-hungry —and the dealer host balked by repeated delivery disappointments—it is good to contemplate the steadily widening stream of Traylor Trucks passing through the portals of this young institution—which, even now, is among the largest of its kind.

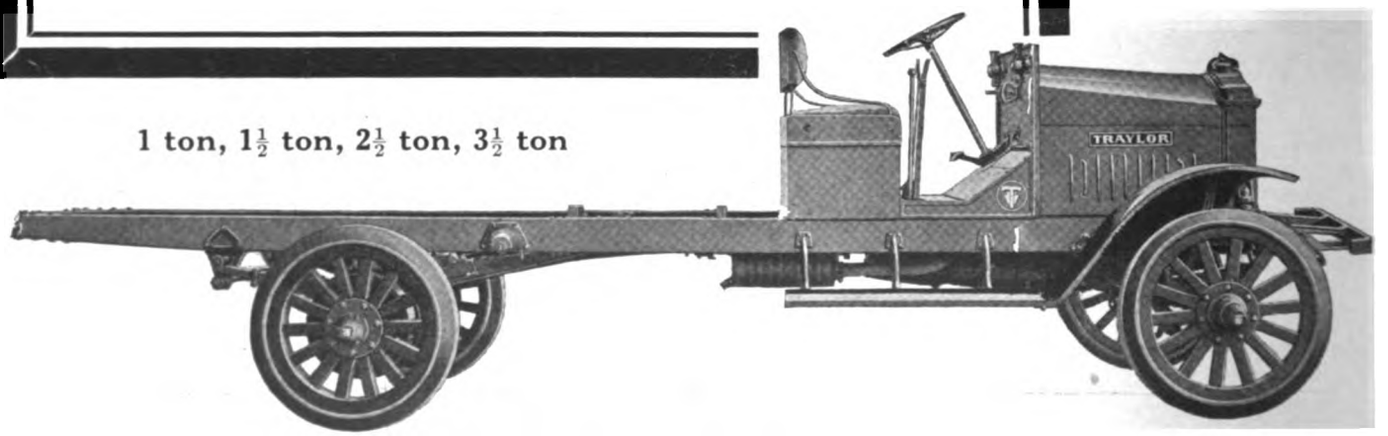
To the dealer who considers the future of his own business this speedy adaptation of tremendous resources means much. It suggests power of a kind that must find expression in *his* growth—and in the expansion of *his business.*

The truck market today acknowledges no dominating factor. It is any man's field. But the capture of it depends not alone on the individual dealer but also upon the power and resources of the organization behind him.

The Traylor Engineering & Mfg. Co.

Truck & Tractor Division **Cornwells, Penn.**

1 ton, 1½ ton, 2½ ton, 3½ ton



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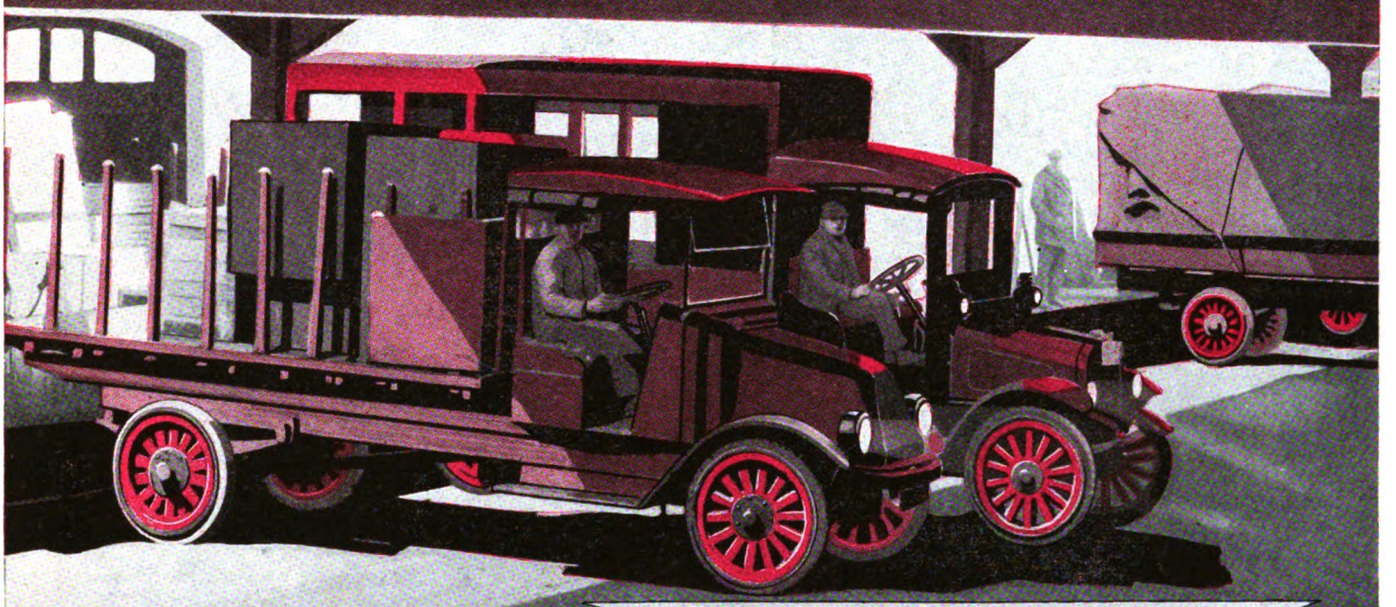
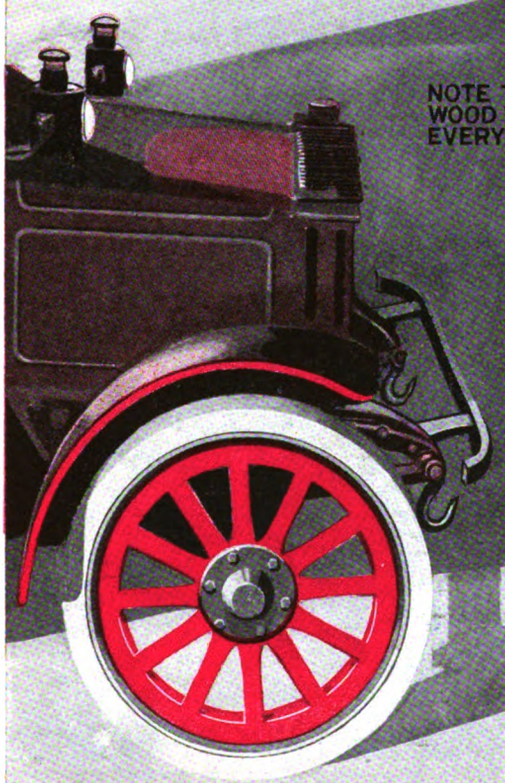
Always resilient





"Do not leave a truck, loaded to capacity, stand for a long time—it is injurious to the springs," say the instruction books. When springs are held flat for a considerable time they become "set"—their resiliency is lost.

WOOD Wheels never lose their resiliency.

Enormous pressure exerted on WOOD Wheels, either while standing or in motion, never affects their resiliency nor their contour.

The ingenious spoke construction of WOOD Wheels distributes a proportionate amount of weight to each spoke and the felloe band.

There are no "don'ts" for WOOD Wheels in truck instruction books.

This is another reason why WOOD Wheels have been used for years and will continue to be used on the world's best trucks.

AUTOMOTIVE WOOD WHEEL MANUFACTURERS' ASSOCIATION
105 West Monroe Street Chicago, Ill.

WOOD WHEELS for MOTOR VEHICLES

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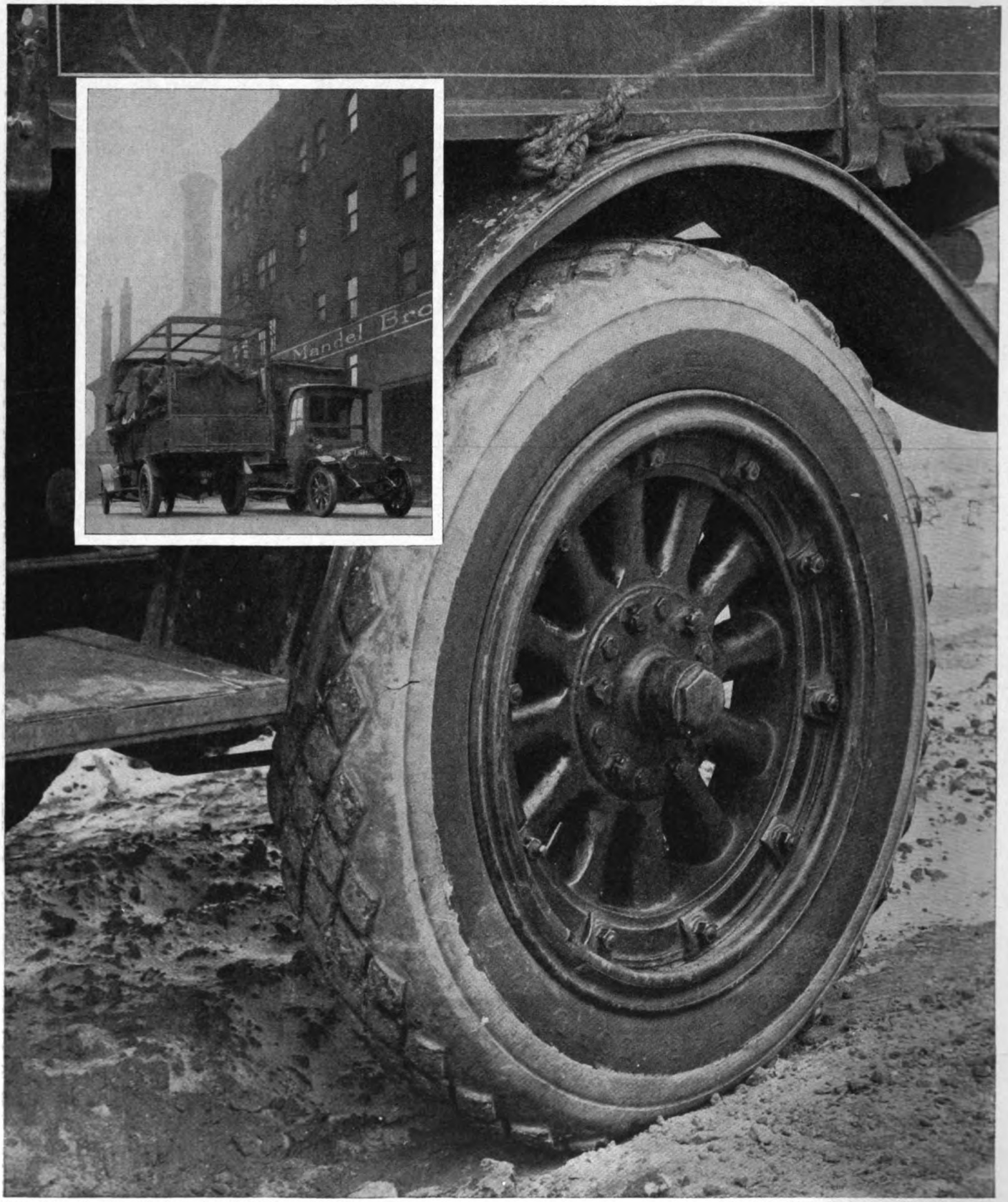

Large photograph: One of the big Goodyear Cord Tires used in the six months' test with solid tires conducted by Mandel Brothers, Chicago. Small photograph: The two trucks compared, No. 45 on pneumatic tires and No. 44 on solid tires

Copyright 1920, by The Goodyear Tire & Rubber Co.

GOODYEAR

Please mention "Power Wagon" when writing to advertisers.

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Increase Truck Sales by Showing How Pneumatics Save

BEGINNING May 1st, 1919, a six months' test of solid versus pneumatic truck tires was conducted by Mandel Brothers, operating a large down-town dry goods store in Chicago. The test was supervised by the company's chief engineer, Mr. Alfred Johnson. Two trucks were used, No. 44 on solid tires and No. 45 with Goodyear Cord Tires on the rear wheels and other pneumatics on the front wheels. Both trucks were employed in regular city delivery work, handling similar loads over similar routes. The results of the test, given below, have caused the company to order recently several new trucks on pneumatics.

	Truck No. 44 (Completely equipped with solid tires)	Truck No. 45 (Completely equipped with pneumatic tires)	Difference in favor of Pneumatic equipment
Number of days operated	130	146	12.3% increase
Miles traveled	5,388	6,719	25% increase
Miles per gallon of gasoline	5.5	7.2	31% increase
Repairs per mile	$ .0109	$ .0057	47% saving
Labor cost per mile (drivers)	$ .20	$ .176	12% saving
Operating cost per mile	$ .353	$ .335	5% saving

NOTE: The actual saving in operating cost amounted to 1.8 cents per mile. Such a reduction grows to a very substantial sum of money when multiplied by thousands of miles of service.

IN cost records like this, the motor truck dealer can recognize the important reasons underlying the demand for trucks equipped with Goodyear Cord Tires.

Many dealers now are using such data in order to secure a firm footing in the greater truck market developed by these pioneer pneumatics.

A considerable amount of this kind of evidence, obtained from different classes of truck and fleet owners, is supplied on request by The Goodyear Tire & Rubber Company, Akron, Ohio.

CORD TIRES

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After the Civil War—the Railroads
After the World War—the Motor Truck

"MOTOR trucks and good roads hold as great a promise for the America of 1920 as the railroads held for the America of 1865.

After the upheaval of the Civil War, the railroads spanned the continent and drew it together. Today motor trucks are reaching out into every corner of the land, affording contact one community with its neighbor, linking each and every one with trunk-line railroads, joining farm and table, joining business with business.

Motor trucks are ready to serve the entire nation with just the complete and flexible transportation facilities the nation needs for the full fruition of its wonderful endowment of natural resources.

The motor truck is one of the real wonders of the age—untiring, quick—freighted with product of factory and mill, of loom, work-bench, forge and farm, it transports raw materials, materials in process, the finished product, from mine and field to foundry and market, to retail store, to home and table.

The advance of such transportation is the advance of civilization itself."

In fact—

Wherever there's a Road

American business men are turning to motor truck transportation

The Manufacturer

Because motor trucks are the quickest and most economical means of hauling between plant and railroad terminals.

Because motor trucks connect his plant with every shipping or receiving platform by the most direct highway, independent of railroads.

They make him independent of freight and express delays and embargoes.

When necessary, the manufacturer himself can go after raw materials to keep unbroken the steady flow of production.

Motor trucks help the manufacturer to make good on delivery promises.

Motor truck shipments make possible a saving in packing costs.

Motor trucks working within the plant keep departments regularly supplied with raw materials and materials in process. In congested plants one motor truck will easily do the work of three double teams or five single teams.

Motor trucks make it possible to establish plants in inexpensive locations away from the congested centers.

The Distributor—Wholesale or Retail

Because motor trucks are the means of rendering more regular and dependable delivery service to customers.

They increase the territory in which a house can do business with profit.

Truck transportation helps speed up the turnover of stock, reducing the necessary investment and storage space.

A reliable motor truck, well-kept up, advertises wherever it goes the stability and progressiveness of the firm whose name is on it.

Controlled delivery with trucks backs up the selling organization with an assurance that the house can make good on delivery dates.

The Expressman and Contract Hauler

Trucks are the only possible means of giving complete, quick service over long and short hauls.

With trucks he can respond to any emergency calls that prove the efficiency of his service and establish his reputation.

Motor trucks mean bigger earnings for capital invested.

They increase the earning capacity of every employee.

They are practically independent of weather, and will work long hours when the rush of business demands it.

The installation of motor trucks reduces stable expense.

The Farmer

Motor trucks place the farmer within easy reach of the markets.

They enable him to take quick advantage of favorable market conditions.

They enable him to deliver his produce in better condition.

Trucks deliver live stock with less shrinkage.

Motor trucks enable farmers to market, before freezing weather, all of their crops that must be shipped during moderate temperatures.

With this closer contact between farm and market the farmer can devote land to big-yield market-garden crops which formerly he devoted to small-yield crops.

The quickness of motor delivery increases the time available for work on the farm.

Trucks facilitate the hauling of fertilizer before the rush of spring work begins. During slack seasons the farmer can profitably employ his trucks in hauling for neighbors.

The Engineer and Building Contractor

Motor trucks alone answer completely the varied hauling needs of the engineer and contractor for quickness, strength and capacity.

They cut down the distance between excavation and fill.

When conditions demand it, motor trucks are ready to work twenty-four hours a day.

It is possible to work motor trucks under practically any conditions of road and weather.

At building operations motor trucks assure at all times a full supply of necessary materials.

THE AUTOCAR COMPANY, Ardmore, Pa., Established 1897

Autocar

This announcement was first published in the newspapers in December, 1919.

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POWER WAGON

Vol XXIV. CHICAGO, MAY, 1920. No. 186

Milburn Wagon Company to Handle Motor Trucks

TO BE DISTRIBUTER FOR THREE STATES

A recent development in the motor truck industry, which shows the trend of things toward automotive transportation more clearly than anything else could possibly show, is a recent arrangement perfected by one of the country's oldest and best known farm wagon manufacturers.

For seventy-five years the name "Milburn Wagon" has been a household word throughout the United States. The house of Milburn has been noted for the quality of its product, and every farmer, both in this generation and the two preceding ones, has known well the product and the reputation of this old and reliable house. It will be news to many who have bought Milburn wagons in the past to read the announcement that the Milburn Wagon

(Continued on page 19)

Forest Reserve Service Is to Be Supplied with Fleets of Trucks

WASHINGTON, D. C., April 22.—The United States Forest Service has lately gone on record as in favor of the employment of motor trucks for the gruelling service in the national forests. This is one of the most significant expressions that has come from governmental officials in the course of their conferences with congressmen relative to the plans for the conduct of the activities of the government during the ensuing year. Chief Henry S. Graves of the Forest Service does not feel that the time has yet come for the government to outfit with passenger cars the forest rangers and other officials in charge of the national forests but for heavy transportation work in the forests, particularly when the fire menace looms, he is unqualifiedly in favor of motor trucks. On this score he recently outlined his position as follows: "I believe it will be desirable in the long run to mave motor trucks in the forests where the hazard of fire is large for transporting materials and men to fires and for similar work."

Railways Ask Commission to Oust 'Bus Lines From Rockford, Illinois

Efforts of the public utility companies to put T. J. Fay out of business at Rockford, Illinois, promise to fail. He is operating a line of motor trucks and 'buses between Rockford and Chicago; Rockford to Oregon, Illinois; Rockford and Camp Grant; and also a line throughout the city of Rockford. The street railway and interurban lines have filed complaint against him before the State Public Utilities Commission, insisting that he be required to make application for a certificate of necessity and convenience. The principal grievance of the street railway company relates to the city of Rockford. The first hearing developed that the Fay line was carrying passengers from Loves Park to the factories for ten cents while the street car line was charging nineteen cents for the same service. The street car company objects to the 'bus line, claiming that neither can make money with both operating and that one or the other should retire from the field.

In the reply of Mr. Fay, he stated that he had $110,000 invested in motor trucks for hauling freight and passengers and if given the authority to operate, he could increase his investment to $250,000 and would agree to take care of all the city transportation in the event that the street railway company gave up the field. Fay also guaranteed more reliable and more satisfactory service than now enjoyed. There is a likelihood that the city council will apportion certain districts which are not profitable to the street railway company, and permit Fay to operate his 'buses and motor trucks there. Negotiations to this end are under way.

Oneida's New Bureau

W. C. Calvert, Newton Cox and R. J. Burns form the personnel of a new department at the plant of the Oneida Motor Truck Company, of Green Bay, Wis., which has been formed to make analysis of the motor haulage problem in the interest of truck operators, fleet owners and dealers. The bureau has been organized to compile cost data, operating forms and to analyze specific haulage conditions or questions for large concerns.

Trucks Save Day for Many Firms During Recent Big Freight Tie-up

The motor truck saved the day for many manufacturers during the recent railroad strike. With freight shipments paralyzed many concerns faced complete shut-downs, had it not been for the employment of motor caravans to transport raw materials and keep production normal.

Government to Determine Truck's Place on Farms

MONEY APPROPRIATED FOR WORK

WASHINGTON, D. C., April 22.—The superiority of the motor truck over the horse for certain classes of haulage in the rural districts is expected to be established by a program of "Farm Power Studies," recently inaugurated by the Office of Farm Management, United States Department of Agriculture, and which will be considerably enlarged in scope after July 1, next, when an increased appropriation allowed by congress for this work will become available. This official survey with the specific object of ascertaining just what proportion of farm hauling may be done most economically by motor and what portion may most advantageously be performed by horses, is likely to give results that will make deep impress upon the minds of country prospects for motor trucks. Both road hauling and farm hauling in its narrower application will be embraced in the forthcoming studies.

With the lately compiled figures for the year 1919 showing a further disastrous slump in the supply of labor on the farms it is admitted that there is urgent need for data that will enable farmers to buy intelligently mechanical power. The Office of Farm Management had planned to spend about $50,000 on this investigational work this season, but congress has so curtailed the allowance that only about half that amount will be available. The "studies" will have to be conducted on representative groups of farms in selected agricultural communities but it is believed that the deductions will be generally applicable.

K. C. Dealers to Organize

Members of the Kansas City Motor Car Dealers Association who specialize in the sale of motor trucks have taken steps to form a separate division of the organization. A committee of five was appointed to draw up a plan of organization and present it at the next meeting.

There are now in Kansas City forty-six dealers who sell motor trucks against twenty-one at the same time last year. The demand for motor trucks is great and the prospects are that the distribution of motor trucks in the Kansas City territory will increase. The committee appointed is composed of P. L. Machette, Harry Crosby, Estel Scott, W. C. Weaver and A. S. Autin.

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Endurance Contest for Motor Trucks Popular

PLANS FOR LONG RUN NEAR COMPLETION

Most encouraging indorsement of the first national motor truck reliability contest has been received from many points along the tentative route of the "run around the money belt," which starts from Omaha in June and traverses portions of seven states in the 2,500-mile journey to be accomplished in approximately twenty-five days, with four Sundays of rest.

In the richest farming country of the world every city and town desires to view the cavalcade, and chambers of commerce, city organizations, newspapers, farming publications and many others who are interested are making every possible endeavor to secure the favor of the promoters. The Bee Publishing Company, of Omaha, which so generously underwrote the event, has informed all inquirers that the pathfinder which will make the trip in May will finally determine the complete routing for the event.

Charles P. Root will himself do the pathfinding so that he may determine the possibilities of the cities and towns to care for the great number of contestants who will be on the tour. Mr. Root will also look into road conditions, the bridges along the route and other material matters which enter into the successful running of the event. He will arrange the route book, arrange for official hotels and for parking spaces, for supplies of gasolene and oil and will attend to a vast fund of work.

Until the completion of his arduous journey in May the final routing will not be known. Every application is receiving consideration of the management. Importance of the event compels careful attention to every detail. The fact that so many of the prominent manufacturers have already expressed an intention of entering and the number of entries already in hand is evidence that this will be the one great touring event for the year of the motor truck world and a contest worth while winning.

Competition for the grand trophy to be known as the Omaha Bee trophy will be very keen. This will be awarded to the motor truck, regardless of size, which has the fewest number of penalties. Under the rules there will be five classes, and a trophy for the winner in each, with one or two other trophies to be announced later.

New Trade Mark Law Is Big Aid to Firms in Business for 25 Years

WASHINGTON, D. C., April 22.—Old-established industrial or engineering concerns that have, in later years, taken up the manufacture of motor trucks, supplies, or accessories, stand to benefit considerably by legislation lately enacted by congress in amendment of the trade-mark laws of the nation. Under the new provision just inserted in the law any firm which has been in business for a quarter of a century or longer will be free to extend to motor trucks or other latter-day products the trade mark or trade name that was originated years ago for the original line of goods.

To appreciate the predicament of veteran concerns that is relieved by this new legislation, it must be borne in mind that in earlier days many firms adopted trade names that are not registrable under the nation's later laws because descriptive or geographical or otherwise ineligible. The old houses were allowed to register their original marks for the goods made prior to the year 1895, but could not extend the right to new products. The legislation now provided puts an end to this discrimination and allows the "family name" to be enrolled for new members of the family of products.

Automotive Industry Ranks Second in United States to That of Steel

That 1920 will be the greatest producing year thus far in the history of the automotive industry can be readily foreseen, with the great demand for motor vehicles in this and other countries. Production in America has reached such a point where the National Automobile Chamber of Commerce announces that this year's business will rank second only to steel.

The 1919 production totaled $1,807,594,580, and if bodies and accessories were included, this figure would be more than $2,000,000,000. Exports of automobiles and parts, including tires and engines, for the government's fiscal year ending June 30, 1919, surpassed all previous records by aggregating $185,000,000. The former high record was in 1916, when $140,000,000 business was done with foreign nations. Of the total amount of 1919 exports, $35,000,000 worth was commercial cars, $75,000,000 worth were passenger cars, $41,000,000 parts of automobiles and nearly $30,000,000 worth were tires, while about $5,000,000 worth were automobile engines.

Milwaukee Sentinel Plans Wide Motor Truck Tour During June

Frank A. Meyer, city sales manager of the Sterling Motor Truck Company, of Milwaukee, has been appointed tour master for The Sentinel's first annual motor truck expedition, which will be held through the richest farming sections of Wisconsin the week of June 21. A committee to assist Mr. Meyer in arranging the hundred and one details of the tour will be appointed.

Milwaukee dealers are displaying the greatest of interest in the run, which will give a first hand demonstration of what the motor truck means to and can do on the farm. A number of dealers and manufacturers have assured The Sentinel of their entries and coöperation.

Last Horse Has Gone

The remaining five horse-drawn companies of the city fire department of Nashville have been replaced by motor equipment. It is estimated by the city officials that one of the new type engines will pay for itself completely in two years' time, at the present cost of feed for the animals.

Ship-by-Truck Week May 17-22 to Be Nation-Wide

TOURS TO COVER ENTIRE COUNTRY

National Ship-by-Truck-Good Roads Week, to be observed May 17-22, inclusive, is being planned throughout the country, according to Washington headquarters of the Ship-by-truck Bureau.

Tentative plans include motor truck tours lasting through the week and covering virtually every section of the country, according to reports received from sixty-five cities where branch offices have been established. Good roads organizations and associations interested in motor truck transportation will form the nucleus, it is said, of a temporary organization to promote activities during the week. Virtually every rural section of the country from coast to coast will be traversed by caravans of motor trucks during Ship-by-truck-Good Roads Week, giving practical demonstrations of the utility of motor truck transportation and preaching the doctrine of better highways.

Other plans include essays by school children, sermons and the distribution of literature, all designed to arouse interest in a national program of highway construction along lines already advocated by such organizations as the American Automobile Chamber of Commerce, the National Grange, the United States Chamber of Commerce, the National Automobile Chamber of Commerce, the National Association of Motor Truck Sales Managers, and the Ship-by-truck Bureau. Governors of various states are expected to issue Ship-by-Truck-Good Roads Week proclamations.

"We need a broadened policy which will concentrate government funds on national highways releasing state and county funds for use on state and county roads," says Senator Charles E. Townsend, author of the Townsend Good Roads bill, discussing the possibilities of the week. "Nothing could be more valuable," he continued, "than a national discussion of this question such as that proposed during the National Ship-by-truck-Good Roads Week."

Professor R. C. Atkeson, Washington representative of the National Grange, says: "I heartily approve the general idea involved in Ship-by-truck Week and the study and attention that will thereby be directed to the problems of highways, transportation and distribution."

Norway Limits Profits

The Norwegian Price Control Commissioner has limited the profits for dealers in motor vehicles to 15 per centum on the first 10,000 crowns, 12½ per centum net on the following 5,000 crowns, and 7½ per centum on large sums. This restriction is said to have been in force since February 15. The above is calculated on cost, insurance, freight and duty. It is said that this measure is part of a policy to limit importation in order to improve Norwegian exchange.

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California to Celebrate Ship-by-Truck Week May 17

MANY TOURS NOW BEING ARRANGED

SAN FRANCISCO, April 21.—California trucking and good roads' interests are making elaborate plans to tie up to national Ship-by-Truck Good Roads' Week, to be observed May 17 to 22, inclusive. Tentative plans include a big tour of approximately fifty motor trucks under the name of the East Bay Ship-by-Truck Tour throughout Alameda and Contracosta Counties, which border San Francisco Bay on the east, under the auspices of the Alameda County Auto Trades Association. Contracosta County is now building new highways which will be completed in the early summer and will naturally open up the entire county to motor truck transportation to a remarkable degree.

The purpose of the tour is to visualize to farmers, merchants and manufacturers in the territory named the general utility of the motor truck. The committee in charge of arrangements expects shortly to announce the entry of a section of the Motor Transport Corps consisting of nine motor trucks, rolling kitchen and band from the Presidio at San Francisco. The Motor Car Dealers Association of San Francisco has enthusiastically endorsed the week and has voted to coöperate with Oakland dealers in making that tour a big success.

The Admen's caravan from the Northwest, attending the national convention at Stockton, arrives in the Sacramento Valley on May 20. Big plans are already being made by the California State Draymen's Association, represented by M. J. Richert, of Sacramento, to arrange for a ship-by-truck demonstration from Chico to Stockton in connection with the Admen's tour. The advertising clubs and automobile associations of Sacramento and Chico are particularly active in promoting this demonstration. Motor trucks will meet the caravan as it nears Chico and escort it to that town, where, in connection with the Motor Truck and Tractor Show then in progress, a big reception is being planned.

The southern part of the state is arranging for a tour of motor trucks touching many important transportation centers in the south. Undoubtedly the remembrance of the present railroad crisis will still be strong in the public's mind during the week of May 17 to 22. It will therefore be a psychological time to dwell on what motor trucks have done and are capable of doing in any emergency. The Firestone Ship-by-Truck Bureaus are working hard with the motor truck and kindred industries to see that national Ship-by-Truck Good Roads Week receives as much public attention as possible in California, which, judging from present plans, will be a huge success.

Winther Lands Big Order

The Winther Motor Truck Company of Kenosha, Wisconsin, has closed a contract for commercial trucks amounting to approximately $3,000,000. This contract embraces the delivery of 1,000 Winther motor trucks of the four-wheel-drive type over a period of 16 months. These machines will be employed in the field work of the American Telephone & Telegraph Company and their production will be accomplished without in any way curtailing the regular production of the company.

Milburn Wagon Company

(Continued from page 17)

Company has decided to enter the motor truck field, and that the motor truck which it will handle in the future is the United States.

The following statement which the company has just made relative to its reasons for this action will be found of interest.

"Vehicle manufacturers 'who think things through' have already realized that the motor truck has supplanted the heavy horse-drawn wagon for use outside the farm. To-day the farmer is thinking how he can make use of motor truck transportation. We believe the vehicle and implement dealer who in the past has sold wagons to the coal-man, the contractor, the farmer, is the logical distributor of motor trucks. Business is done on confidence and who more firmly holds the confidence of the business public and the farmer than the implement dealer? The Milburn Wagon Company has contracted for the wholesale distribution of United States motor trucks, made by the United States Motor Truck Company, of Cincinnati, Ohio, for the states of Ohio, Michigan and Illinois."

Much has been written upon the subject of the motor truck and its uses upon the farm, but the fact that one of the foremost wagon builders in the country has taken this step is complete evidence of the ascendency of the motor truck in the field of transportation.

Fiats in Africa

In northern Africa there has for a long time been a shortage of means of transport, not only of railway, but of general motor transportation. The latter has recently been relieved to a considerable extent by the arrival of the most important consignment of motor vehicles ever sent to Algiers. This consisted of 150 Fiat motor trucks (half of them having a load capacity of 3½ tons and half carrying 4½ tons), one twenty-eight seated motor bus, six Fiat touring cars, and one agricultural tractor.

Goodyear in Brazil

The Goodyear Tire & Rubber Company has completed arrangements with the Brazilian government for the erection of a South American factory to be located just outside the city of Rio Janiero. Construction of the foundations has already begun and it is believed that the new factory will be completed within a year and a half. The factory group will consist of four buildings built to allow for adequate expansion. At first 1,000 employes, mostly Brazilians, will operate the plant, which will probably have a capacity of about 1,500 tires and tubes a day.

Uncle Sam to Search for Secret of Fuel Economy

BUREAU CHIEF WANTS $100,000 TO START

WASHINGTON, D. C., April 24.—To prevent waste of fuel in the operation of internal combustion engines is a responsibility so obviously important at this juncture that members of the motor truck industry will welcome the news that the United States Bureau of Standards proposes to tackle this problem in earnest if congress will provide adequate funds. Director S. W. Stratton, head of the Standards Bureau, declares that not less than $100,000 should be expended by the government this next year or two to prosecute research work undertaken during the war with the object of finding ways and means for fuel economy.

This significant line of effort, which was initiated during the war at the request of the War Department, concerned itself at the outset with aviation engines exclusively but Dr. Stratton states that he now desires to extend the investigation and experiment to motor trucks which, with the increasing proportions of highway transport will require an ever-increasing share of the nation's output of petroleum products. It should be made clear that these "power plant investigations" aim not so much at consideration of the operation of motors as at improvement of design with the object of increasing efficiency along with economy of fuel consumption. Indicating that the Standards Bureau is no more than well started on what he denominates "one of the most important investigations ever undertaken," Dr. Stratton recently remarked: "We have hardly begun to get the facts regarding the devices upon which fuel economy depends."

Outlining the ultimate practical application within the motor truck industry of the facts that the experts at the Standards Bureau hope to unearth, Dr. Stratton explained: "If a man who is designing a carbureter or radiator knows the fundamental scientific laws involved in the action of the carbureter or radiator he can design it much more intelligently. If he knows the characteristics of the fuel or the efficiency of the fuel to be used, he can design his carbureter for that fuel. There is the greatest need for information of that sort."

Taking up another ambition that bodes well for the motor truck industry, Dr. Stratton told of his desire that the government's matchless resources at the National Bureau of Standards should be turned to an authoritative probe of the mysteries of lubricating oil. Said he: "We want to know the facts about lubricating oil—what makes a good oil and what makes a bad oil. At present very little is known. Notwithstanding the numerous uses of lubricating oils scientific investigation of the materials for the purpose of ascertaining the properties upon which their usefulness depends has just begun. It is a most important and pressing need at the present time. It would be good business for the government to expend at least $75,000 immediately in this investigation."

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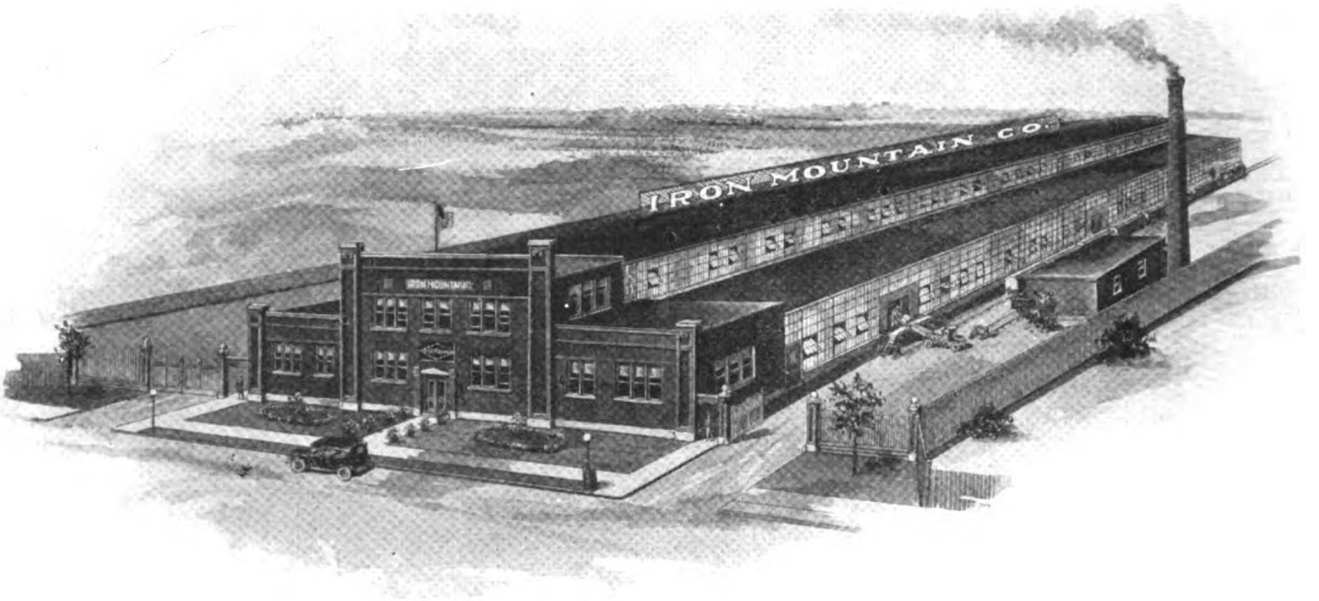

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POWER WAGON

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Caveat Emptor

TIMES such as these are productive of many strange phenomena, not the least of which is the evidently universal desire to take advantage of the credulous and to exploit the ignorance of the unwary. Of course, no one is so unsophisticated as to believe that business generally is conducted on ethical principles, but it has seemed during the last generation that much of the traditional chicanery, which was the heritage and pride of medieval traders, was becoming taboo. At any rate business enterprise was being clothed with an atmosphere of fair dealing which was calculated to win the approbation and confidence of the buyer. Within the last few years, under the stress of exceptional conditions which commonly awaken the basest motives in men, much of this spirit has been stifled by the dictates of expediency, and in this respect the motor truck industry has been neither better nor worse than others.

No particular allusion is here intended to the common practice of raising prices, which can be defended on many grounds and is nearly always justified, certainly in principle if not in degree. The increases which have been asked by motor truck manufacturers are, we believe, very reasonable on the whole, and cover usually no more than the actual increases in the cost of materials and labor plus a premium to offset the increased risks of doing business and to guard against the uncertainties of irregular supply and disordered buying. They compare very favorably with increases current in other trades, whose products do not often offer to the buyer the same economic opportunities.

Much more harmful, in our opinion, is the practice of overrating the capacity of machines, which, while not general, is sufficiently common to arouse interest and provoke inquiry. We have had unusual opportunities for observing this tendency and do not hesitate to condemn it for its injustice to the seller and his product as well as to the buyer and for its dangerous possibilities for the industry at large. Were the truth widely known, buyers would be amazed at the ease and rapidity with which a machine regularly rated as of 4 tons capacity can be converted, without any change whatever in specifications, into one of 5-ton rating. A new model number, a higher price, and a new load-rating make the deception complete. In some cases the wheel-base is slightly lengthened or the tire sizes increased in order to make the vehicle appear to be on a par with its companions in the class to which it is newly assigned. In no particular affecting its ability to perform in a satisfactory and economical manner its new duties are its mechanical features altered. Yet to the unsuspecting buyer it has all the indicia of its new order and only in the record of its economic performance will the truth be disclosed.

This industry is not beyond the age of fallibility; it is also too young to jeopard its future goodwill through the silent approval of methods that can not be defended by anything more solid than sophistry. The conservative element, which has so consistently advocated the adoption of sound policies, is not, we are happy to say, itself a party to the practice, nor is it likely to condone principles which are inimical to the solidarity of the industry from which it takes its living. It should, however, make widely known its opposition to such dangerous methods, chiefly by avoiding all appearance of indifference to them and also by open disapproval. Industrial permanence will not be built on any such flimsy foundation as the old legal injunction of "letting the buyer beware."

Truck Efficiency

IT IS only within recent years that the term "efficiency" has conveyed any reasonably clear idea when applied to motor truck operation. Previously it was indicative of a dimly visible goal, vague as to nature or proportions, uncertain as to remoteness, and extremely doubtful of attainment. Lately it has become something more tangible, if not in its entirety, then at least in some of its particulars. If nothing more, we are approaching toward an understanding of what efficiency comprises, in what directions its factors lie, and in what manner they can be studied and controlled. Because these things have been unknown or only imperfectly realized, most efforts to arrive at efficient operation have borne little or no fruit beyond disappointment and costly experiment.

There is no difficulty in feigning wisdom after the fact, but it should have been evident from the first that the surest way to maximum economy (which few have recognized as synonymous with efficiency) lies through the driver and those with whom he comes most frequently in contact. Recognition of this fact has led to some astonishing results, and these have indicated very definitely the direction in which future progress will be made. As typical of what can be accomplished under the proper incentive, example may be made of some of the results disclosed by truck operating efficiency tests, notably that conducted by the Packard company. Thus, it has been found that a driver operating a 1-ton vehicle decreased his loading time by one-third and increased fuel mileage by 15 per centum, the cost of operation being lowered 5.5 cents per ton-mile. The fuel consumption of another machine, 1½-ton rating, was reduced one-fifth in six months, saving $71.75, and its repair cost was kept at less than 1 cent a mile. A 2-ton vehicle was in service 365 days in one year, hauling 3,500 tons of milk at $1.30 per ton over an 8.5-mile trip. Another machine, of 3-ton rating, carried 4,472 tons in 327 working days at a repair cost of only 0.77 cent per mile. Two hun-

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dred and thirty-eight dollars were saved in fuel consumption by the driver of a 4-ton vehicle through a 69 per centum reduction in fuel consumption. Five miles per gallon of fuel was the average for the year of a 6-ton machine, and its repair cost was less than three-quarters of a cent per mile. One might cite other similar instances of the astounding economies that can be effected by an intelligent spirit of coöperation between driver, shipping clerk and the truck manufacturer.

Policies, such as that which has produced the results described, offer a very powerful stimulus to the desire for maximum economy and maximum performance and have the additional advantage of arousing widespread interest in these factors of operation and of giving nation-wide publicity to the results. They lend the very encouragement necessary to develop the best spirit in those who are chiefly responsible for motor wagon economy, and invite, by the suggestion of temporary standards, the continued and ever-widening circle of competition so essential to success. Although they do not represent finality in any sense and are therefore susceptible of further improvement, they merit the fullest applause since the evidence they provide can be made of such immense value to the industry, in design as well as sale.

Motors on the Farm

OPPORTUNITIES for the sale of motor trucks to farmers have engrossed the attention of many manufacturers for the last few years, and the results which have attended even the most casual efforts to understand the rural market have supplied all the encouragement necessary to sustain the original interest. In spite of the farmer's attitude, characterized by skepticism and fortified by financial difficulties, a surprisingly large number of machines has been sold for farm duty, and it is now generally felt that we are well on the way toward a sound knowledge and appraisal of the country buyer and his needs. Although the returns have been flattering, there is danger that our hope may outdistance the fact, and that the rate of expansion now so clearly indicated may not be maintained.

A rare association of unprecedented circumstances should be accepted as the true explanation of the farmer's handsome response to motor wagon selling effort. Transportation difficulties, a shortage of labor, good prices for agricultural products, and other war-born conditions of national and local significance have combined to produce a favorable situation of which the motor wagon makers have not failed to take full advantage. The resistance to selling has therefore not been as great as under normal surroundings, nor has the question of economy been raised as often or as seriously as is usually the case in other industries. Necessity and the ability to purchase have been the chief features of most sales to farmers and they are the most powerful factors in breaking down the normal resistance of first-time buyers. In admitting this there is no implied depreciation of the efforts of those who have made the sales, for it has been a very trying and, at times, discouraging business, but it should be understood that the special conditions which have produced the remarkable record now available will not be duplicated and that whatever the future will lack in that respect must be offset by a better knowledge of rural transport problems and more intelligent selling effort.

In the use of motor trucks agriculture ranks first among the great industries of the country and it has attained this position within the short period of the war. A little over a year ago there were 26,413 motor trucks in the service of American farmers, or more than were owned at the beginning of the war by all the industries of England. The United States Department of Agriculture, through the Office of Farm Management and the Brueau of Crop Estimates, places the number of motor trucks now used by farmers at 49,195, but admits that this estimate may vary as much as 25 per centum from reality. Accordingly, actuality may lie anywhere between 39,000 and 65,000, although we should incline toward the smaller figure. Whatever the actual number, the matter of major interest is to be found in the fact that the rural market is the greatest potential outlet for motor trucks at this moment and that its possibilities are only becoming evident. For many years it will probably continue to absorb more product each year than any other one or two of the country's great industries. Measured by such standards it merits the closest study and investigation by all those who are in any way related to it.

Taxing Trailers

THE recent ruling of the United States Internal Revenue Office with respect to the taxation of trailers affords an instructive commentary on the practice of legal acrobatics brought into play when an attempt is made to correct the defects of revenue producing legislation. It is now ordered that "an automobile truck or automobile wagon formed by joining together a so-called tractor or semi-tractor . . . and a so-called trailer or semi-trailer is taxable as a whole as an automobile truck," that is, at the rate of 3 per centum, but when the two are "sold separately, the so-called tractor or semi-tractor is taxable as an automobile truck or automobile wagon" (3 per centum) "and the socalled trailer or semi-trailer as a part" (5 per centum).

In other words, tractor is tax free when it draws a 4-wheeled trailer, but is subject to a tax of 3 per centum as a motor truck when it draws a semi-trailer. Furthermore, a semi-trailer is considered a motor truck and therefore taxable at the 3 per centum rate when sold with a tractor, but is treated as an automobile part taxable at the 5 per centum rate when sold separately.

Aside from the strange reasoning which can produce such absurd conclusions, there is the danger that the ruling may be made retroactive, although last year's regulations stated that "the act specifically exempts tractors, even if sold in combination with a trailer" and that "automobile trailers, regardless of the number of wheels which they may have, are not parts of or accessories for automobiles." To hold the manufacturers for the payment of this tax on sales made prior to the date of the latest ruling would be most unjust to the makers who can not, of course, at this late date collect the tax from the purchasers. It is to be hoped that the Treasury Department through the Internal Revenue Office will give further study to the trailer and tractor situation which should not be made to bear the burden of illogical discrimination.

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Profitable Side Line For Salesmen

Salesmen who call upon dealers, fleet owners, transportation managers, factory engineers, garages, parts and accessory makers—all who are actively interested in the sale, application, production, equipment or repair of motor trucks — can make from $5.00 to $10.00 a day by exhibiting and explaining the use of a well advertised article which almost sells at sight.

A ten-minute talk will effect a sale.

Commissions only, payable immediately or upon completion of transaction. Sample will be furnished free.

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Elimination of Street Car Tracks Is a Step in Municipal Progress

Action by the Broadway Association, of New York City, in advocating the removal of car tracks and the installation of motor driven vehicles, is not only an indication of municipal progress, but an admission of the necessity of employing motor-driven vehicles to relieve traffic congestion.

A city or community's growth in traffic is the result of business expansion and it is to be expected of every municipal government to see that traffic conditions are handled in the best interests of the city. We understand that investigations have proved that a street devoted exclusively to motor-driven traffic, will handle more people with less confusion and congestion than a wider street that accommodates both street cars and motor-driven vehicles. If this is so, there isn't any doubt that it will pay most cities to prohibit all vehicles but that of the motor-driven variety on its principal thoroughfares to insure better handling of traffic and an elimination of traffic congestion.

Highway Motors Buys G. B. & S.

The new Highway Motors Company, of Defiance, Ohio, has taken over the plants, good-will and business of the Golden, Belknap & Swartz Company, Detroit, and the Fruchery Machine Company, Detroit. The new corporation is capitalized at $1,500,000, of which $750 000 is preferred and $750,000 common stock, and is incorporated under the laws of Ohio. The officers are: Charles H. Kettenring, Defiance, president; R. P. Kettenring, vice-president, also of Defiance; E. H. Belknap, vice-president and chief engineer; J. W. Swartz, vice-president in charge of purchases; J. W. Wright, secretary and treasurer, in charge of sales and advertising, and W. R. Fruchery, factory superintendent, the four latter men all from Detroit. Plans have been developed for the production of a minimum of 150 motors a day on an eight-hour shift with a capacity for twice that number working on double shifts. A new factory, already erected at Defiance, is now being equipped with a complete line of modern machinery.

Shipments Show Increase

Shipments of machines in January and February amounted to 46,812 carloads, compared with 36,191 carloads in the same period last year. In these two months 57,482 machines left the factories in drive-aways; this would have made 16,500 carloads more. Reports received indicated that shipments for the month of March would amount to 28,000 carloads, compared with 23,744 carloads in March last year. Drive-aways in March will probably amount to 46,000 machines, equal to an additional 13,000 carloads.

Nash Considers Building

So great has been the demand for Nash passenger cars that it has fairly pushed the motor truck business out of the parent factory, and it is understood that a separate factory for motor trucks is likely to be a new development of the near future.

Germans Ask 200,000 Marks For Highest Class Cars

MANY OLD FIRMS OUT OF MARKET

The production of motor vehicles in Germany and Austria is not as intensive as might be desired. Strikes and labor controversies, shortage of raw materials, high wages, and lack of skilled workers needed for certain parts of the work, such as the installation of motors, aggravate the crisis through which this important industry is passing.

The production, in its reduced volume, can not even satisfy the needs of the domestic market. In Germany and Austria, during the war, no private person was allowed to have an automobile, with the sole exception of the few physicians who had not been mobilized. When the war ended, and with it the restriction, all those who had formerly owned automobiles wanted to have them again, and the demand consequently was much in excess of the supply. The state sold a large number of motor cars from the remaining war stocks, at prices rather high; nevertheless, there is a lively demand for new cars just coming from the factory.

It is evident that this demand has tended to increase prices, even more than the exportation of automobiles, which, owing to the falling exchange value of the mark, requires an increase in prices if it is to be profitable. It is said that sales to foreigners will only be made in stable money. Austria is already pursuing this policy and demanding payments in Swiss francs. Another solution proposed is that adopted by the Publishers' Association, that of reckoning exchange at a fixed rate. Both of these methods tend to increase the prices.

In addition, there is the tax and the export permit. Germany is now considering the introduction of a new tax of 25 per centum ad valorem. An export permit costs about 4,000 * marks, and application for it must be made at Berlin. It takes from two to three weeks before a permit is issued.

Nearly all the chassis are provided with electric starters, lights, and horns. The electric equipment, manufactured by Bosch, which is used on most of the good cars, costs 14,000 marks. Delivery is made f. o. b. factory, unless the contract provides to the contrary, but the cars lack pneumatic tires, as both countries are almost wholly bare of this article.

The prices vary enormously with the terms of delivery, whether it is to be made immediately or at some future time. On the average, the manufacturers promise delivery in the spring of 1921. As a result, such cars as are finished and ready for delivery command very high prices which for some types of cars are double the factory price.

The Mercedes car, type 16 to 45 horsepower, with a pointed radiator and 5 metal wheels cost about 100 000 marks at the factory; with immediate delivery the price rises to 200,000 marks. An American firm has purchased a large number of these cars at the rate of $5,000 a car. Opel makes a 6-cylinder car, of 18 horsepower, with 6 metal wheels, which sells for 136,000 marks. Benz manufactures an 8 to 20 horsepower type, selling for 100,000 marks, and a powerful 6-cylinder car of 40 to 50 horsepower, the price of which is not known. Other factories such as Horch, Timson, Hansa, Lorelei, Protos and others have no cars for sale.

*The German mark on March 30, the date of these figures, was 1.57 cents.

Admit Country Dealers to Second Largest Organization in Illinois

The Vermilion County, Ill., Automotive Dealers' Association, was organized at a meeting held in Danville, April 8. Officers were chosen as follows: President, Harry L. Snyder; vice. president, Edward C. Kurman; secretary, Daniel Beckwith; treasurer, Alden H. Parker. The officers are all from Danville.

Eighty dealers filed applications for membership and it is hoped to increase the number to one hundred. J. C. Thorp, Ray Sparks, McCurdy Spang and A. A. Cuppy, all dealers of the Champaign association, were present and assisted in the organization. It was voted to affiliate with the new state association, organized recently at Springfield, and also the national association. The new association has the largest membership of any of those in Illinois, outside of Chicago, and is said to be the only one in the state where the county as well as the city dealers, were invited to membership.

Stations for Trucks

Further evidence of the proved practicability of the motor truck express is disclosed in the establishment in Toledo, Ohio, of a union depot solely for motor truck freight.

It is a modern structure of two floors and basement. The equipment will include electric elevators and other machinery which will aid in the speedy handling of freight.

According to E. A. Williams, Jr., president of the Garford Motor Truck Company, who some time ago urged the systematic organization of motor truck interests, such depots soon will be established in all trade centers.

Truck Again Beats Horse

A 2½-ton Republic motor truck demonstrated last season in striking manner the value of motor haulage in handling sugar beets in Colorado. The sugar making season is short, lasting but a few weeks. When the beets are ready for the sugar factory, it is necessary to get them from the fields to the plant in the shortest possible time.

A team, with a load of 5 000 pounds, averaged 40 minutes for a 2-mile haul from the beet field to the factory. The 2½-ton motor truck carried 6,000 pounds, averaging 12 minutes for the same trip, and made seven miles to the gallon of gasolene.

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12 Trucks and 24 Trailers Solve San Antonio's Garbage Problem

Garbage disposal methods in San Antonio, Texas, have undergone considerable change in the last two or three years.

The handling of all garbage collected by the city was formerly done by the use of wagons. After a thorough investigation a system of hauling by motor truck and trailers was adopted, and this has proved most satisfactory. The city is now operating 12 motor trucks and 24 trailers, two trailers to each motor truck. There is one driver for a motor truck, and two pick-up men. The pick-up men are constantly patroling the district covered by the machines. They do not go to the dump with the motor trucks, but are left in the city reloading the trailer while the extra machine goes to the dump with the filled trailers.

Comparison of the cost of the old wagon system with that of the new system shows a saving of between $25,000 and $30,000 a year, or approximately 33⅓ per cent of the old cost of collection. Not only is this of material benefit to the city as regards expense, but the work is done more rapidly, and hence is a greater accommodation to the public.

When the motor trucks were installed in San Antonio there were 48 wagons in service. The population was about 125,000 people. The rate of hire for each wagon was $3 per day; hence, with an average of 26 working days per month, this entailed a total monthly expense of $3,744. Under the present system the city is serving a population of 200 000.

Is Buying Truck Lines

A transaction which should mean much to Shelbyville, Indiana, in a shipping way was brought to a close recently. The sale of Webb's Transfer Line to the Union Transportation Lines of Louisville was made. The Union Transportation Lines is a corporation formed some months ago by a group of men prominent in shipping and business circles in Louisville. The object of the organization is to engage in highways transport business along lines which have proved successful in other parts of the United Staes. The company proposes to operate motor truck lines on regular schedule in all directions from Louisville, their main central point.

Buses for Lexington

Motor bus lines to sections of the city not served by the street car routes of the Kentucky Traction & Terminal Company became an assured fact recently with the announcement of B. J. Treacy, chairman of the housing committee of the Lexington Board of Commerce, that a company is now being organized to operate motor buses on regular schedules to suburbs and localities without city car service. Operation of the buses is a part of the program of the Board of Commerce to relieve the acute housing shortage by inducing Lexingtonians to build homes in the outlying sections now without street car service.

Traffic Control To Exert Broad Influence

Problem Is Slowly Developing on Highways and Showed Early Possibilities During Recent War

COL. MARK L. IRELAND, of the United States Transport Corps, speaking before a recent meeting of the Society of Automotive Engineers on the broad subject of military traffic control as it is related to highway traffic, said in part:

"Traffic control is not concerned with measures relating to the efficient use of vehicles, their suitability for their cargoes, proper loading, fitness for service, appearance and like questions, nor for their road discipline, as individual vehicles or as organizations, when this road discipline affects only maintenance of vehicles. These are questions of motor-transport control, or command. Traffic control is vitally concerned as soon as any of the above points affect the time that a vehicle takes in passing over a given stretch of road which happens to be under traffic control, the degree of congestion on this road and the wear-and-tear upon the road surface. It involves not only the giving of orders for the dispatching of transportation, but more particularly observation of how the dispatcher's orders are carried out as to routes, time schedules, cargo loading, condition of vehicles en route, road discipline, etc. In fact, dispatching of transportation follows immediately upon the purchase of the vehicles, in either civil or military experience. Maintenance is the first lesson for the adventurer in the field of motor transport. The necessity for traffic control is the second lesson. The third is that the traffic-control system, like its counterpart in railroad operation, must supplement and be a part of the dispatching system.

"THE war has brought us to a stage of development and knowledge of the possibilities of motor transport and the highway which we could not have reached for many years in peaceful experience, for the reason that peace-time demands could not create a need for such large volumes of motor transport. Hence, for several years to come, the motor-transport officer must be the pioneer in the development of the science of economic quantity-transportation on the highway.

"The hopelessness of marked improvement under the limitations of animal transport prevented any marked advance in military train operations for thousands of years. Will motor transport be able in a few years to break the fettering bonds of military habit? The great value of the flexibility of purpose of motor transport must be grasped.

"The work of the cavalry in the war should not be belittled. It was almost everything that had not been expected of it. It was disappointing to the true cavalryman in almost every way. Not only did he not ride into battle on his charger, except in very rare instances, but he saw even the artillery horse ride into battle in a motor truck. And mounted infantry is an obsolete term except to describe the infantryman who is hurried over 5 to 8 days' marches in a motor truck in 1 day or less. Not only does the hope of "the train" of the future lie in the fact that it has become the carrier of military passengers, but this fact carries with it the army's hope of victory. Army reserve trains and a traffic control which can arrest for the moment ordinary routine supply traffic to give priority to emergency troop and supply movement, form the keystone of the bridge of military traffic. An army which aspires to an honorable record of fitness for its task, of ability to meet the burdens and problems of modern warfare, and desires a chance for victory when it accepts battle, willingly or unwillingly, must acquire and retain superior mobility. This can come only from a thorough understanding of the necessity for keeping the motor transport of an army "in hand," in large reservoirs, under the will of higher commanders.

"THE power of mobility given by motor transport must not be frittered away by a piecemeal distribution of perquisites of position for anyone and everyone. The supreme commander must not find himself blocked and thwarted in his efforts to stem an enemy offensive or to seize a favorable opportunity for a counter-offensive. Available reserves of men, guns, supplies and motor transport must not be useless luxuries in a crisis because the man who is fighting the battle can not control either the roads or the motor transport. Roads need not be blocked by the routine traffic of subordinate commanders. It can accomplish quite as much in the same time by using its allotment of road capacity.

"Traffic control started in civil life. The part which fully-develop traffic control is to play in civilian life is beyond the power of any person to predict because we are still too far away from concentrations of traffic which tax the 100 per centum capacity of highways. It is still too easy to divert traffic to new routes, to widen or otherwise improve congested streets. Even military traffic control is still in its infancy. The highway problem is not yet sufficiently acute in civil life to demand an approach to the solution forced upon military men. When the time comes the civil problem will be more difficult because the traffic will lack the unity of purpose and the discipline of military traffic. The civilian traffic current teems with individuality and restiveness under restraint or guidance.

"The solution will be in different form and slower, because the need for it will come more slowly and rampant individuality must be coped with. However, it must come. The most important centers of traffic already have tower-control stations similar to the interlocking switch and signal towers of a great railroad terminal."

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52 Truck Makers Meet With Timken Axle Heads

PROBLEMS VITAL TO INDUSTRY DISCUSSED

An unusual meeting was held in Detroit in March, when, in response to an invitation from the sales department of the Timken-Detroit Axle Company, fifty-two of the company's commercial car customers met with the executives and department heads at the Detroit Athletic Club to discuss various problems of motor truck manufacturing and marketing. The meeting was entirely informal, as P. W. Hood, sales manager of the Timken company, explained that the customers had been invited to the meeting not to listen to any set speeches by the Timken company, but to discuss the various problems in which they as manufacturers of motor trucks, and the Timken company as manufacturer of an important unit of their vehicles, were vitally interested.

President A. R. Demory gave an accurate description of the ideals and achievements of the Timken-Detroit Axle Company in supplying the most important unit of the product manufactured by the members of his audience. "Not a manufacturer present is receiving the number of axles he desires or could use, but every one is receiving the number of axles promised. Mr. Demory made it clear that while the output of axles is steadily increasing, the uncertain quantity and quality of steel, together with the difficulty in securing other materials in large quantities, such as malleables, stampings and forgings, made it necessary that no extraordinarily optimistic promises could or should be made regarding appreciably larger deliveries than have already been promised for 1920.

It was the unanimous opinion of the motor truck manufacturers who attended the meeting that the present method of giving motor trucks a definite capacity rating, or a chassis rating, is the only practicable and sensible system of procedure. Motor trucks are designed to carry specific loads, with a certain factor of safety, and if they are loaded beyond the capacity rating given by the manufacturer, his responsibiltiy naturally ceases. It was felt that to change present methods would be productive of endless trouble for both the builder and the parts maker.

The subject of pneumatic tires for motor trucks was also discussed and a number of motor truck builders gave their personal experiences. It is evident that this idea is still too new to warrant any definite program regarding increased ratings for power wagons so equipped. It was agreed, however, that the pneumatic tire will have its place on motor trucks, especially on sizes up to 2½-tons. Doubt was expressed by some of those present, however, regarding the success of pneumatics as a commercial proposition on motor trucks of 3½- and 5-ton capacity, due to braking difficulties and the increased expense of tire equipment.

In discussing the possibilities of the speed wagon, the majority of manufacturers present seemed to feel that attempts to convert passenger cars into motor trucks had not met with any great success up to the present time. It was felt, however, that there is a very definite market for a vehicle designed to carry about 1,500 pounds, to be equipped with pneumatic tires, and to make up in speed what it lacks in carrying capacity. A number of manufacturers gave their companies' personal experience in designing and building speed wagons, and the majority maintained that such a vehicle should be built along the lines of a lighter motor truck and keep away from passenger car practice. The bevel drive type of rear axle seemed to be favored for this particular class of vehicle.

The question uppermost in the minds of the manufacturers present was, of course, "When can you give us more axles?" General Manager Fred Glover answered this question by stating that if the company could secure the material for which they had already contracted, that a possible 12½ to 25 per centum increase could be expected in production by the end of 1920, and that the company was now considering a 50 per centum increase for 1921.

Bad roads are causing a loss of more than five hundred million dollars a year.

Uses Green Peppers to Prove Truck Efficiency

SELDEN MAN SAILS FOR SOUTH AMERICA

J. H. Wise recently sailed for South America and the Latin-American states to investigate and develop possibilities for the sale of Selden motor trucks in that territory. He is working under the direction of Gaston, Williams and Wigmore export house which company handles Selden foreign business. Mr. Wise will go directly to Reo de Janiero, then on to Sao Paulo. Monte Vidio, Uraguay, Buenos Aires, coming back to Para and Bahia, then over to Trinidad, Columbia and Venezuela.

"It is interesting to note," comments Mr. Wise, "that during the month of June, 1919, 256 motor trucks were imported by Latin and South American states; Mexico came first, then Cuba, Trinidad and Uraguay, other states following. This would indicate that there is indeed a market for motor trucks in these countries, but it really does not begin to show the great possibilities for trade.

"It is a well known fact that the reason for undeveloped South America, is lack of transportation facilities. The building of railroads to the interior that would properly transport the raw materials and manufactured products, are prohibitive because of the enormous cost of constructing such lines. But highways can be built at a reasonable cost and the flexible motor truck can be utilized to develop South America and this is just what will happen."

"But he must be made to understand it is to his advantage—his profit—to get his goods to market quicker. Take green peppers for instance. The season in Cuba is three or four weeks ahead of Florida. Green peppers grown in Cuba can be on the market in the United States or elsewhere, fully a month ahead of the Florida product—thus getting top prices. This is possible only if a proper marketing system is used and this means the utilization of the motor truck."

Truck makers attending Timken convention in Detroit.

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Will Pneumatic Tires Replace Solids?

By HUGO HOFFSTAEDTER,
President, Polack Tire and Rubber Company.

NOTWITHSTANDING all that has been published in advertisements or trade articles and more that has been said in the last two years or so about the use of pneumatic truck tires, it remains a fact that only a small percentage of what may properly be called motor trucks (excluding light delivery vans) are equipped with pneumatic tires and even these, for the most part, are installed on trial and not because of proved service advantage. It also is a fact that the largest motor truck fleet owners, such as the oil companies and express companies, for instance, who maintain expert engineering staffs, whose function it is not alone to keep posted on improvements in their equipment, but to adopt any improvement which is profitable for them to adopt, have no thought of changing to pneumatics.

By far the larger majority of motor trucks remain equipped and are being re-equipped with solid tires, in spite of the wide publicity advocating the use of pneumatic motor truck tires. It follows that the intelligent motor truck user is far from convinced that the use of pneumatic tires is of practical advantage to him and it would be very interesting to hear from other than trade sources, what any of the experiments have so far revealed. Nevertheless, the assertion is quite frequently heard that pneumatic tires are about to supercede solids and serious, attempts are made to reason out that forecast, just as, at the time of the first appearance of the so-called "demountable" truck tires, it was predicted that the pressed-on type of tire would not survive. Of course, if it is necessary or even desirable to have pneumatics rather than solids on motor trucks, it will be only a question of time before that will happen, but something really practical must be gained by it or it can never become necessary or desirable.

LOOKING at the topic from the practical side, therefore, let us try to find the answer to the question whether pneumatic truck tires will ever replace solids. J. N. Gunn, president of the United States Tire Company, in an article appearing in this journal recently (February), sounds a warning note on the danger of promiscuous change-overs and says that because most trucks are designed for operation on solids, the users may find pneumatics unsuited to their requirements. In all the articles, which have appeared in favor of pneumatic truck tires, the main point rests on increased speed to attain an increased radius of action for the purpose of thereby justifying the higher expense of pneumatic truck tires; in other words, doing more work in a shorter time. No attempt has as yet been made to show a reduced up-keep cost by the use of pneumatics, as compared with solids, where the factor of speed does not enter, but it seems to be taken generally for granted that, ignoring increased speed, solid tires permit of more economical motor truck operation than do pneumatics.

Most of our best motor truck engineers do not hesitate to assert that before pneumatic tires can be generally adopted, the present construction of motor trucks would have to undergo a radical revision to make them suitable for higher speeds. A mere change in tire equipment naturally does not change the motor truck construction and does not permit the use of the machine beyond the limits which were assumed as a basis in its design. It need hardly be said that such a radical change can not be made by the vast motor truck industry from one season to the other, but, even if found desirable, would necessarily consume a very long time. Whether or not such a departure is desirable is still an open question which confronts the industry. Is it necessary to drive motor trucks at the speed of passenger cars?

RIGHT here it is noteworthy that in all the old established transportation systems a great difference in speed is being maintained for passengers and for freight. On the railroads the trains carry passengers to their destination in a fraction of the time it takes freight to arrive at the same destination. In the steamship service the same comparison holds true, passenger carriers maintaining a greater speed than freight carriers, not because freight can not be transported by those same systems as rapidly as passengers, but rather because there exists not the same necessity. Speed for motor trucking depends, of course, on service requirements which vary with practically every service, but for purposes of this article, only two broad groups of service need be considered: Long-distance and local hauling. The overland or long-distance hauling by motor truck is of rather recent inauguraion and was largely inspired by the congestion of the railroads brought about by war conditions. A number of hauling concerns have already gone into the business of overland freight transportation by motor trucks and, while no doubt a great development in long-distance motor trucking will take place, still it would seem that the largest number of trucks will continue to be used for local hauling.

In a well planned business requirements are so well anticipated that, with rare exceptions, sufficient time can be allowed for shipments via the cheapest route. Therefore, time or speed, normally, is not so much the factor, and long-distance hauling by motor truck will therefore be successful only in proportion to its economy. Local hauling, on the other hand, is indispensable, because there are no rival means at disposal in this horseless age. But granting that for overland deliveries, because of the greater speed to be attained, pneumatic truck tires are the logical equipment (though to this day the majority of trucks even in this kind of service continue to be epuipped and reëquipped with solids), that sort of service can hardly serve as a gage by which to determine the right kind of tire equipment for motor trucks used in local or city service which, as shown, represents the bulk of motor truck work. Analyzing the service which the average city machine is called upon to do, we find that for the most part the distances between two stops are very short. Most of their time is spent in loading, unloading and waiting, and the very little time which could be saved through greater speed, even if permissible, is negligible for practical purposes. The average city motor truck does between 25 and 50 miles a day and especially in congested cities, even with increased speed, would have no use for more. Traffic congestion and traffic restrictions in most American cities are such that, irrespective of the speed in the vehicle, it could not be utilized to its full advantage for local deliveries. What can therefore be gained by more speed than the present motor truck construction permits? Moreover, the average city street has a smooth surface and is kept in good repair and the ordinary solid tire affords ample cushion at the speed at which motor trucks, or for that matter any other kind of vehicle, are allowed to operate.

THE practice of overloading motor trucks is almost universal and it is very questionable whether such a deep-rooted and general habit can ever be eradicated. Most power wagons are designed to carry a reasonable overload and stand up under the abuse which the average motor truck receives. So are solid tires. In other words, solid tires are foolproof and for freight transportation, the simple, foolproof part is only just good enough. Pneumatic tires are far from foolproof. They will not stand such abuse.

It seems a good view to hold that solid tires fill a totally different need than pneumatics and that the two will continue to exist alongside each other, each in its proper place. In deciding on their tire equipment motor truck owners are best advised to render account to themselves of their particular service requirements. If the motor truck is intended for city hauling, they will undoubtedly obtain the best results out of solid tires, generally speaking; whereas, for long-distance hauling, it is largely a question of load. For heavy loads again the solid tire is the logical equipment, whereas for light hauling and particularly in the case of perishable goods, the pneumatic tire is the better choice, provided always that the increased speed to be obtained out of pneumatic tires can be fully utilized to compensate for the increased cost of tire up-keep. In such cases,

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however, the recommendation is in order that the motor truck owner select a machine which has been designed for speed and not one which was built for use on solid tires, else the wearing strain through increased speed may more than offset the difference between the cushioning effect of solids against pnumatics and the life of the motor truck may be decreased in spite of the use of pneumatics.

Favor Standardized Fleets

For the benefit of the ice cream trade in general a poll was recently taken among representative ice cream dealers in New England to determine the factor that contributed the most toward efficient deliveries of ice cream. New England was selected because it is believed that in this territory the business has reached a high state of organization.

The result showed that the great majority of New England ice cream men believed that standardization on a single make of motor truck was the factor that had effected greater economies than any other. They gave as the principal reasons for this greater efficiency through standardization that (1) the driver's time was saved by a thorough operating knowledge of the standard motor truck and (2) that a saving on spare parts carried in stock was effected.

One Man for 31 Trucks

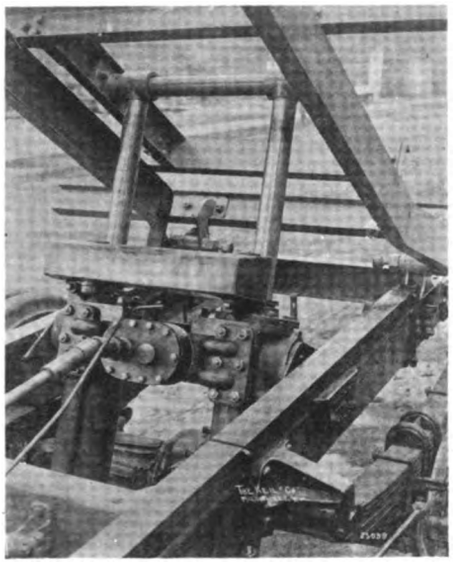
Sam Davis, a big coal dealer of Toledo, shows what can be done in holding down maintenance costs on motor trucks by maintaining a fleet of thirty-one Republic power wagons with only one repair man.

These machines are nearly all of 3½-ton capacity, chassis fitted with dump bodies, and they are given the usual hard work that falls to motor trucks used in hauling coal. These trucks operate every day and are not laid up for repair.

Hydro Hoist Meets Need in Transportation Field

DEVICE IS SIMPLE AND POWERFUL

The rapid development and increased demand for the Hydro hoist—the vertical hydraulic hoist mounted under the body—seems to be proof that there is a decided need for it. The Hydro hoist is manufactured by the Hydro-Hoist Company—a subsidiary company of The Heil Company and the hoist is manufactured under the same roof with "Quality" combination and steel dump bodies and compartment truck tanks.



Hydro hoist mounted.

There are now four sizes of Hydro hoists manufactured for the various capacity chassis—a hoist for every make and model of motor truck. The No. 4 Hydro is built for machines rated to 3-tons capacity; No. 5 from 3 to 5½ tons and the No. 6 from 6 to 10 tons. The No. 7 hoist is designed primarily for certain 4-wheel drive motor trucks which have the propeller shaft on the side. It is rated for machines up to and including 3 tons capacity.

The Hydro hoist is the simplest type of hydraulic hoist. It consists of one or two vertical cylinders, depending on the location of the propeller shaft, mounted on the chassis frame just in front of the rear axle and about in line with the front shackle of the rear spring.

The cylinder and tank are filled with a medium heavy engine oil. The gear pump which creates the pressure, is located in the manifold between the cylinders or in front of the cylinder. The power to drive the pump is taken from the front propeller shaft or transmission amidship and is applied by operating a control lever in the driver's seat.

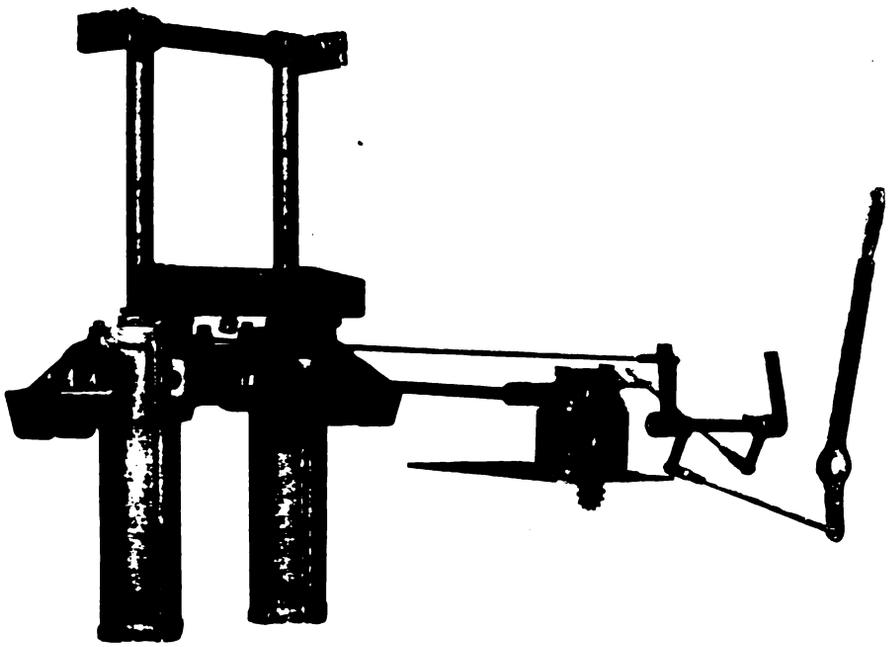
The oil passes through the port into the gear pump and is carried by an outward rotation to the bottom of the pump where it is forced out through the check ball valve. This valve keeps the oil from flowing back through the pump. An oilway carries the oil to the bottom of the cylinder where the force is applied directly to the piston head. The piston moves up until at the height of its stroke the head passes the oil port thereby shutting off the supply of oil and automatically stopping the hoist. The pump can continue to rotate as it turns in a bath of oil.

To lower the body a valve located in the back of the manifold or cylinder, is opened. This allows the weight of the body to force the oil in the lower part of the cylinder through oilways and the open valve back into the upper part of the cylinder. The body therefore comes down only as fast as the oil is displaced. The rate of speed at which it comes down is uniform—a steady, even movement. At no time, even though the driving shaft or valve control were broken, could the body fall and break the chassis frame. This is a most important feature.

There are only a very few working parts to the Hydro hoist (no pulleys, cables, pipes or the like) and this simplicity makes it easy to operate and care for, as all parts are readily accessible. Moreover, the hoist does not interfere with the accessibility of the motor truck parts such as the transmission case and brake rods. The control lever operating both the valve and the sliding gear or clutch is located in the cab or with the gear shift. It is simple, substantial and very handy. The hoist can be easily drained when required by taking out a pipe plug. The lifting force of the hoist is virtually unlimited.

The improved design of the hoist makes it possible to dump an unevenly distributed load or a load with one rear wheel lower than the other. Moreover its suspension on the chassis frame is such that it does not interfere with the flexibility of the chassis. Practically every Hydro outfit will give a 45-degree dumping angle. The Hydro hoist engineering department furnish installation and layout drawings

(*Continued on page* 73.)



Hydro hoist with power connection for transmission amidships.

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Trade Paper Advertising Pays

By GILBERT U. RADOYE

Director of Advertising, Hayes Automobile Company, Kokomo, Ind.

AUTOMOBILE trade papers have a very definite place in the modern advertising campaign of large automotive institutions, and are of distinct value to the advertiser. This truth has been brought to me through actual experience in directing the advertising campaigns of the Haynes Automobile Company and in observing the results of similar campaigns.

The trade paper as an advertising medium is in fact a necessity to the automobile manufacturer. The producer of motor vehicles, probably more so than any other manufacturer, must depend solely on his dealer organization as an outlet for his product because it is through the dealer organization that motor vehicles are sold to the public. And because the dealer is such an important factor in the marketing of the machines, the trade papers loom up as the most efficient and most economical method of perfecting a dealer organization, capable of handling the manufacturer's product. That, of course, is the chief reason for the motor vehicle manufacturer to use trade papers.

The automotive trade papers are produced primarily for, and are read by the dealer. Therefore, trade paper advertisements are read by the bulk of the motor vehicle dealers in the country. By this method the dealer organization is constantly expanded, undesirable dealers are replaced by desirable ones, and an effective distribution, which is absolutely essential to the success of a large concern, is obtained.

TRADE paper advertising, according to our experiences, also serves to stimulate the morale of the dealer and to keep him satisfied. For instance, when a dealer reads an advertisement in a trade paper, he is apt to wonder if the company is dissatisfied with him and is seeking a new dealer in his place. As a result of this thought, the dealer, especially if he nas not been as active and aggressive as he should be, puts forth stronger efforts to market his product.

There is also a favorable psychological reaction in the dealer's mind when he reads the advertisements in the trade paper, because of the nature of the trade paper copy. These advertisements are a personal message from the management to the trade. They reflect the success and popularity of the product. In this way, they keep old dealers convinced that they are selling a high-grade product that is in big demand among the buying public. These advertisements also attract many new dealers of recognized standing and merit.

There is another angle to the need for a country-wide dealer organization in addition to that of effective distribution. That is the question of service. Efficient service is an important factor to-day in the success of any institution that sells its product to the public. This is emphatically true of the motor vehicle industry. The man who buys a machine wants to be assured of prompt and efficient service. This he can not obtain unless the manufacturer of the machine he purchases maintains a dealer and service station in all the centers of population in the country. The argument of service has closed many a sale.

Trade paper advertising provides the manufacturer with a large potential supply of dealers. As a result of advertising of this nature our company has provided itself with a list of high-class dealers in practically every state in the Union, so that should one dealer suddenly sever connections with the company, we could immediately turn to our files, select the names from the location in question, and within a short time the old dealer has been replaced with a new one. Without these lists the task would be a long and tedious one, involving additional expense and the loss of representation in the territory in the meantime.

TRADE paper advertising is also valuable when the manufacturer produces a new model. Through the medium of the trade paper, the old dealer readily acquaints himself with the salient features and selling points of the new model, and prospective dealers, who are always reading the trade papers with a view to bettering their connections or for taking on a new line, become interested.

The Haynes Automobile Company has used foreign automotive trade papers for advertising purposes with telling effect. Without the aid of a personal factory representative either in South America or in Europe during the past year, our company, through the use of the foreign trade papers, has acquired a large number of high-class dealers in these countries. All of these foreign connections are proving extremely satisfactory and reliable. What more convincing proof is needed of the efficacy of trade paper advertising?

The Haynes Automobile Company has found trade paper advertising of inestimable value in building up a country-wide dealer organization which is absolutely necessary for the successful merchandising of the company's product. It is also necessary from the point of view of service to the owner. Trade paper advertising builds up the morale of the dealer organization and provides a list of potential dealers of the right character, a vast reserve upon which the company may draw in time of necessity. Through its trade paper advertising our company has been able to send a personal message to every automobile merchandiser in the country. Both in America and in foreign countries Haynes trade paper advertising has proved to be an actual business insurance that is as essential as a bank reserve.

Truck Roads Underground

Lord Ashfield prophesies that it will be found necessary not only to increase the number of underground railways in London, but also to build underground roads devoted exclusively to fast motor traffic. "These underground roads," says he, "could be connected with the outer districts to what might be called boulevards, and those boulevards, again, would be used exclusively for fast motor traffic."

The same authority gives some instructive figures. Last year all the combined forms of transport in Greater London carried, roundly speaking, 2,900,000 000 passengers, and in carrying this huge number no fewer than 265,000,000 miles were run by the various forms of traffic. To attempt to give some idea of these figures, the milage equals 10,600 journeys round the world, or 252 trips from London to the moon.

Hercules Buys Foundry

The Hercules Motor Manufacturing Company, Canton, Ohio, has purchased a complete foundry in order to make a large portion of its grey iron casting requirements. The tremendous demand made upon the grey iron foundries producing high-grade automotive castings has been so great that in recent months they have been unable to meet the demand. Undoubtedly this condition has done more to retard engine production than any other single item.

The Motor Castings Company, as the foundry will be known to the trade, has a capacity of 65 tons of finished castings per day. The Motors Castings Company was formed as a separate corporation, subsidiary to the Hercules Motor Manufacturing Company. The officials are R. W. Gallagher, president; Charles Balough, vice president; George W. Russell, secretary and treasurer. The comapny is capitalized for $500,000.

Skinner Joins Agency

Daniel O. Skinner, for the past six years advertising manager of the International Motor Company, New York, has joined the Buffalo division of the Manternach Company. His experience and ability in the creation and carrying out of large advertising campaigns in the automotive industry will be exerted toward the development of industrial and automotive accounts in the Buffalo territory. Mr. Skinner will also have supervision of planning and the handling of all accounts in the Buffalo office.

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Available Truck Company Increases Line with Addition of 7-Ton Model

The Available Truck Company, of Chicago, to its other models, which have been well-known for over ten years, has added a 7-ton machine. This new model is a giant in size and a great burden-bearer. The first number of this model, now being operated in Chicago, carried for its maiden load 21,800 pounds of coal.

Specifications for the 7-ton model are as follows:

Engine—Bore 5 inches, stroke 6¼ inches. Horse-power SAE 50, actual 56, at 1200 RPM. Positive oil pump giving both splash and force feed oiling to parts.

Ignition—High tension magneto.

Carbureter—Latest model built in with motor.

Clutch—Dry multiple disk type. Oil cup on dash lubricates thrust bearing. Positive but gentle in action and never needs adjustment.

Transmission—Four speeds forward, and one reverse. Mounted amidships.

Universal Joints—Mechanical enclosed type with tubular shaft between transmission and rear axle, where great strength and flexibility are necessary.

Front Axle—Drop forged I-beam type.

Rear Axle—Double reduction type, with heavy steel housing and shafts.

Gear Ratio—14-1.

Wheels—Cast steel type with hollow spokes.

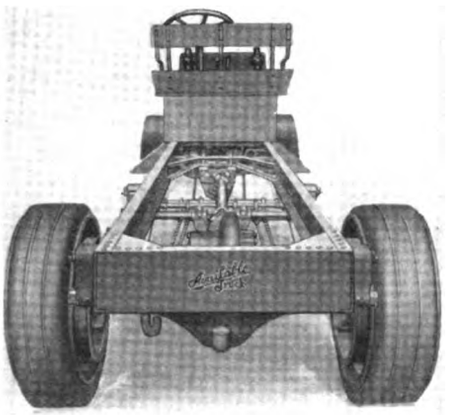
Springs—Heavy leaf silicon manganese steel. Bronze bushings throughout. Front 44 by 3; rear 60 by 4.

Frame—Channel steel. Hot rolled 9-inch section, 15 lbs. to foot. Flange width, 2 13-64 inches, side thickness ⅜ inch. Gusset plates 12 by 12 by ¼ inches; all holes drilled in jigs, hot riveting throughout. Width 36 inches.

Wheelbase—Standard 190 inches provides 14 feet of frame behind driver's seat. Optional length at extra cost.

Brakes—Internal expanding in 24-inch drums. Both service and emergency working through equalizing bars.

Equipment — 27-gallon gasolene tank. Driver's seat. Three oil lamps. Tools and horn, 36x6 front and 40x7 rear dual, tires. Capacity payload 14,000 pounds.



Rear view 7-Ton Available.

Design—Construction: Three point suspension motor, mounted directly over front axle, receives full benefit of front springs. Radiator is protected by heavy bumper attached to frame and seven steel ribbed guards in front of core. Hood sides of original design provide maximum ventilation, Lovres, placed well to rear, compel 20-inch fan to draw all air through the radiator core. Steering drag link so mounted that wabbling of front wheels is eliminated under all road conditions. Phosphor Bronze bushings used at all wearing points. Alemite system.

Accessibility—Motor sits high in frame, permitting easy access to carbureter, magneto, governor, valve tappets, oil filler cap, and sight gage. Timing gears can be readily removed without disturbing balance of motor. Clutch, control levers and transmission are separately removable.

Radiator—Cast Tank: Removable core, finned tubes flattened, reducing damage by freezing to a minimum. Unusual capacity, insuring positive cooling under all conditions; ½-inch drain cock at lowest point of radiator. Full spring suspension, without twisting and pounding, is obtained by double springs enclosed, and working in oil at each side.

Hood—Heavy Gauge Sheet Steel: Of original design, ventilator in top adjustable by thumb screw. Removable sides closely fitted, held in place by strong springs, eliminating rattle and vibration.

Fenders and Steps—Sheet Steel Heavy Gage: Edges of fenders reinforced with steel angles for strength and fastened securely to frame and step; no rattling. Steps are of original design, extra heavy sheet steel, strongly reinforced and riveted to frame. Tool box built integral with step.

Drive—Radius Rods: Take driving strains and keep the rear axle in perfect alignment. The springs thus relieved afford maximum flexibility under all load conditions. Breakage and trouble are eliminated.

Available 7-tonner with 22,000-pound load.

Hawkeye State Shows Slight Lead in Use of Motor Trucks on Farms

Iowa farmers have more motor trucks in operation on their farms than any other state, according to advance information from the Office of Farm Management of the United States Department of Agriculture.

From figures gathered by crop reporters over the nation it is shown that 50,000 motor trucks are used solely for farm work. Of this number 2,773 are found in Iowa. Pennsylvania is second with 2,760 and Nebraska third, with 2,739.

In listing these motor trucks only those which were used entirely for farm operations were considered, so that many machines used for part time services were neglected. If these were counted the numbers would be increased at least 75 per centum.

Motor trucks used in regular route hauling were also neglected and while all of the motor trucks were not listed, the numbers show the relative distribution very satisfactorily.

Leavenworth Ad Chief

James A. Braden, advertising manager of Standard Parts, severed his connection with that company on May 1, to devote his time to personal interests. Ralph W. Leavenworth, for nearly two years assistant advertising manager, will become chief of the department.

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Depreciation of Trucks on Rising Market

Owners Should Figure Delivery Costs on Increasing Values and Not on Original Purchase Price

THE motor truck business is unusual in that a salesman must not only know motor trucks, but must have a working knowledge of fundamental business conditions. This fact was emphasized recently, when a salesman for a well-known motor truck dealer in a Middle-Western city called on a coal dealer, who was a big user of the machine involved, and therefore worth keeping in touch with.

"No, I don't need any new motor trucks just now," responded the coal man, who was plainly worried. "And the truth is that I couldn't afford to buy them if I did need them. I paid about $1,200 for the motor trucks I have, didn't I?"

The salesman acknowledged this to be true.

"And they are quoted now at around $1,800, aren't they?" continued the coal dealer.

The salesman nodded.

"Well," continued the coal man, "where do I get off? If they have gone up from $1,200 to $1,800, there is no guarantee that some day they won't come down from $1,800 to $1,200. That will mean, if I replace my machines for $1,800, that I stand to lose $600 on each one when the slump takes place. I realize that you don't know any more than I do whether or not a slump will take place, and when, if ever. But if I replaec my motor trucks, I'll have to put $600 more into each one, with the possibility that the $600 will vanish into thin air eventually, with the downward trend of the market."

THIS dealer's attitude explains why it is easier to sell motor trucks to a business man who has never used them than to one who has, and who is confronted with the necessity for replacement. Those who learn that they must invest more money in machines than ever before are somewhat disturbed over the discovery. Often, as was the case with the coal dealer referred to, the money isn't on hand. Users are in the habit of depreciating a motor truck on the value they paid for it, and overlook the fact that replacement comes higher.

It is a fact that price is not a good thing to emphasize in selling a motor truck or anything else, under ordinary circumstances. Many salesmen have continued to emphasize the things the motor truck will do for a given business, rather than the price it costs, and this line of selling is undoubtedly the correct one in normal times. But the times are far from normal, and the salesman in this instance decided that it was time an educational campaign was being waged by motor truck interests. He got all of the information he could bearing on the question and returned to the coal man.

"You've been all wrong," he told the dealer, "and it's partly our fault, because we haven't kept you acquainted with the rising values in motor trucks, as we should have done. And as a result, you haven't prepared to pay more money for your next machine.

"You are a dealer in coal and you know the possibilities a rising market always brings. If a stock of coal has cost you $5 a ton and then goes up to $6 before you sell, you feel that it is legitimate to sell on the replacement basis of $6, instead of the price of $5 that you actually paid for it. Why? Because in the end you may pay $6 for a yard of coal, and then see it go down to $5. That means that you have to sell on the lower replacement value, losing a dollar on every ten. This loss is offset by the extra dollar you made at the beginning of the market movement. You didn't regard that extra dollar as profit, but a sinking fund to tide you over an expected emergency.

"YOU understand all of this because you are in the coal business. What you didn't understand was that the motor truck situation is the same as all others, and that the cost of motor trucks is rising, with the possibility that in the end it will fall and cause a real loss to users who weren't well informed.

"The proper way to depreciate a motor truck on a rising market is just as you sell coal under the same conditions. You shouldn't be figuring delivery costs on an investment of $1,200, but on one of $1,800, or the replacement value of your delivery equipment. If you have been delivering coal on a charge of 50 cents a ton, of which you figure 25 cents to be the cost of the motor truck investment, you should raise this to 37½ cents, because the cost of the machine has gone up 50 per centum. If you handle it in this way, when you come to replace your old motor trucks, the money will be on hand. In other words, you have a double depreciation to meet—the real depreciation of a motor truck that is in service, and the possible deflation which may result from causes beyond your control.

"And while I am on the subject, I might give you a tip and say that the same thing is true of your other machinery. When you buy your conveyors, you'll have to pay more for them. The thing to do is to get ready to pay more by making your conveyors earn more money."

When the salesman left, the coal man was in a much more optimistic mood, confident that he was on the road to handling his business more efficiently. Incidentally, the salesman was sure of getting the next order from this dealer.

What is true of this retailer of coal is true likewise of many other users of motor trucks. Ordinarily, a business man is able to meet any situation arising in his own field, but he fails to consider the fact that the methods of meeting a changing market must be applied to his delivery service as well as to his stock. Manufacturers who deal in machinery every day are exceptions to this statement, for most of them realized that they would have to deal in replacement values temporarily and they included their motor trucks in the adjustment. Dealers are less analytic, apparently, and while perfectly able when it comes to a discussion of dry-goods or shoes or any other commodity in which they deal, lose sight of salient facts in regard to motor trucks. Hence there is a field for education which has been overlooked to some extent in the trade. And it is a work which is vital, because only by dealing in replacement values can many motor truck users raise funds with which to buy new machines when the old ones are ready for the scrap pile.

Illinois Towns, in Role of Dick Turpin, Stop Driveaways on Highways

Some cities of Illinois, notably Danville, are holding up dealers and their representatives, who are driving machines overland from the factory, to see whether or not the drivers are licensed chauffeurs or prospective owners of the cars they are driving. The new motor vehicle law requires that all persons who assist in such driveaways must be licensed, except in the event that they expect to purchase the car they are driving. If it becomes necessary to take out a license for every driver and pay the regulation chauffeur's salary, there will be a heavy addition to the cost of driving machines from the factory, as the additional cost must be borne by the public buying the cars so handled.

Owner Demands County Remove Motor Truck Stalled in Mud Hole

Truck owners of Illinois will be interested in an unusual case from Macon County. A motor truck owned by Byrd L. Davis, of Decatur, became stalled in the muddy road near Elwin. Davis was unable to remove it and abandoned it. Its location was such that the progress of other vehicles was prevented and complaints were heard. After the motor truck remained in the road a week, the sheriff ordered Davis to remove it. He declined and his arrest and incarceration in jail followed. He at first refused to give bond, but after experiencing the inside of the county jail, relented and gave bond. He proposes to fight the case to the highest court and will maintain that if the township permits such impassable roads that it is the duty of the township to remove vehicles if they become stalled.

A Correction

The Reynolds Motor Sales Company, of Detroit, has no connection with the Reynolds Motor Truck Company, of Mt. Clemens, Michigan. The sales campaign company simply has the sales agency to Reynolds motor trucks in the state of Michigan.

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Republic Orchard Sprayer Demonstrates Economy

IS GREAT TIME AND LABOR SAVER

The 1200-tree apple orchard of Mr. King, situated two miles from Staunton, Virginia, was the scene of a recent demonstration conducted by the Republic Motor Truck Company, of Alma, Michigan, in testing out its new orchard sprayer.

The Republic orchard sprayer, designed and built for use on a 2½-ton chassis, is an exclusive product and the only equipment of its kind on the market at the present time. Its perfection is the result of long and studied experiments which the Republic company made with a view to offering to orchard owners a practical and efficient tree sprayer.

In the test conducted in Mr. King's orchard a solution of lime and sulphur was used. With a man driving a motor truck and two others using spray guns, the small trees in this orchard were sprayed at the rate of about 150 per hour. During the test the sprayer outfit proved clearly its ability to do its intended work quickly and efficiently, and foreshadowed a remarkable improvement in orchard spraying.

The tank has a capacity of 6,000 gallons. The pump is of the Northern rotary type, driven from the power take-off attached to the transmission. The capacity of the pump is 30 gallons per minute against 300 pounds pressure. The excess capacity of the pump not used by the nozzles is pumped back into the tanks through jets located along its bottom, thereby providing perfect agitation of the spraying liquid.

The ability of this sprayer outfit to deliver two powerful sprays while being driven over the ground at low speed makes it the fastest working sprayer ever offered fruit growers. The spray pump operates either while the motor truck is in motion or standing still, and pressure can be maintained at the 300-pound mark without difficulty under all conditions. The spray thrown by the guns is exceptionally fine, which means economy in the consumption of spraying liquid. This is an important item and assures economy both in the amount of solution used as well as time consumed in spraying.

Among the most prominent features of the sprayer may be mentioned that the tank is self-filling, self-agitating and self-cleaning. Of particular importance is the fact that the entire tank and all its attachments are easily removable, as will be observed in one of the accompanying illustrations. This feature enables the owner to use his chassis for general hauling when the sprayer is not in use. Fruit growers will readily see the advantages afforded by this feature.

Expert Advice Necessary to New Purchasers of Motor Trucks

There are so many possible factors to be considered in the selection of a motor truck (or motor trucks) to cope with a particular hauling problem that it behooves the prospective purchaser to obtain expert advice before buying. This is specially true where the buyer has had no previous experience with motor truck equipment. Hauling problems naturally vary in different lines of business, in different localities and with other governing conditions. There are numerous items which are to be given consideration in selecting the right motor truck for the right job. Among the more important are the following:

First—Kind and quantities of goods to be hauled.

Second—The distribution area.

Third—The condition of highways, the grades and climate.

Fourth—Frequency of necessary stops, particularly in delivery.

Fifth—Loading and unloading facilities.

Sixth—The capability of drivers.

Seventh—Housing of equipment.

Eighth—Ability of manufacturer to give service.

Ninth—Speed which can be maintained in accordance with state and city laws.

Tenth—Advisability of pneumatic tire equipment.

Eleventh—The institution back of the motor truck.

In many instances it would not be necessary to consider all these factors; in other instances it might be essential to consider others, all in accordance with the circumstances.

Trailers Taking Important Role in Motor Truck Transportation

Basing his forecast on reports received from sixty-five trucking centers, E. Farr, director of the Firestone Ship-by-truck Bureau at Akron, Ohio, predicts that the day is rapidly approaching when trains consisting of motor trucks and trailers will be seen on the highways as frequently as motor trucks are to-ady.

"We learn," says Mr. Farr, "that the trailer, given good level roads, can reduce operation costs 20 to 40 per centum.

"One readily appreciates that railroad freight rates would be many times higher than they are if each freight car operated separately, since the number of railway employes and the total fuel consumption would be multiplied many times.

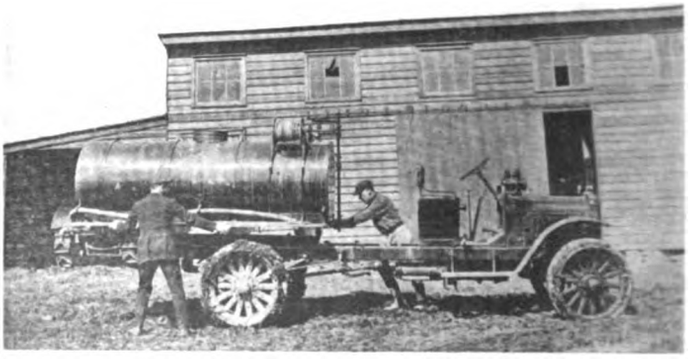
"As the capacity of a motor truck is doubled and sometimes tripled when it hauls trailers and as under some conditions it can haul two or three trailers, it can be seen that to a considerable extent train operation economies that hold good on the railways are not impossible in operating trains of motor trucks and trailers on the highways.

"Bad roads in many sections are the drawback to-day. But better roads are coming and coming rapidly. As they become more general the use of the trailer, with its attendant economies, is sure to become more general.

Concerning Loads

Load distribution is of the highest importance. The motor truck is designed to carry a certain proportion of its load on the front axle, and the remainder on the real axle. If the body is not chosen properly for the sort of load to be carried, it will result in the load being concentrated at the wrong point. This gives the same effect as overloading, because if too much of the load is placed on the rear axle, it will not make any difference if the total load is under the normal capacity of the motor truck. The fact that bodies must be chosen not only to carry the load conveniently, but also to concentrate the load at the proper point, leads to some unusual constructions to meet unusual operative conditions.

Republic sprayer at work.



Removing tank from chassis.

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Efficient Trucking of Steel

Philadelphia Firm, Doing World-Wide Business, Has Warehouses Equipped with Every Modern Device to Speed Loading and Unloading of Motor Trucks

SPEED in handling and loading on its motor truck fleet for distribution the various heavy kinds of articles of its output, and efficiency in their delivery from three warehouses equipped with various labor-saving devices are high lights of the routine at the plant of Horace T. Potts & Company, of Philadelphia. An important point in its motor truck operation is that the firm's chauffeurs and helpers are all "converts" from horse-drawn vehicular transportation.

This old established firm is known as one of the largest wholesalers and retailers in the East, of bar, tool and sheet steel and iron, babbitt metal, welding rods, rounds, plates, shapes, anvils, iron wire and the like. Much hauling is done of heavy materials sold to coal and gold mines and to various lines of manufacture.

Because of the extremely heavy nature of the firm's units of output and the necessity for dispatch in handling and distributing, devices to facilitate loading have been found especially desirable. The solving of the different problems presented by the demands of the business has been done in an interesting way.

The motor truck fleet consists of the following:

No. 1—Four and a half-ton Packard. Delivers orders to and from warehouses, hauls to and from cars and wharves. Averages ten miles a day.

No. 2—Six-ton Mack. Same general type of work as the foregoing. Covers an average of ten miles daily.

No. 3—Two and a half-ton Mack. Covers city deliveries rapidly and averages fifteen miles a day.

No. 4—Six-ton Packard. General work, about the same as Nos. 1 and 2. Frequently used with 5-ton Warner trailer. Averages ten miles daily.

No. 5—One and a half-ton Ford. Specializes on quick deliveries of comparatively light loads. Averages fifteen miles daily.

FOR emergencies the transportation department uses a 5-ton Warner trailer, already mentioned in connection with truck No. 4.

All the motor trucks are of the same type—open platform with short stakes.

There is also the following fleet of passenger cars for members of the executive force and operating department heads:

Three Franklin touring cars, two Overland touring cars, two Buick touring cars, one touring car, each, of Pierce-Arrow, Maxwell, Allen, Nash, Chevrolet and Ford manufacture; two Buick coupes and one Ford runabout.

This equipment, then, comprises 21 motor-propelled machines and one trailer.

But the firm still maintains horse-drawn auxiliary equipment for short hauls and long waits. It has two teams with two 5-ton, open-platform wagons for constant use and one reserve team and a 5-ton wagon of similar type, one single horse with a 2½-ton, open-platform wagon for constant use and a light rig in reserve. The horses are stabled in commodious quarters on the second floor of the building known as warehouse No. 2.

The rule for loading the motor trucks is to place on them 2,000 pounds to the ton—not the long ton, or 2,240 pounds. Seldom one of the units of the fleet has an overload, and machines Nos. 3 and 5, the lighter ones, never are loaded to capacity. This detail of care keeps down repair bills and permits the motor trucks to be on the road the maximum amount of time.

THE motor trucks usually operate within the city limits, running to and from wharves and freight stations, manufacturing plants, warehouses and the monster cranes of the Philadelphia & Reading and the Pensylvania roads. The cranes at which the motor trucks unload are the Reading's, at Twentieth and Hamilton Streets, and the Pennsylvania's at the Shackamaxon Street and Thirty-first and Chestnut Streets freight stations. Heavy materials like rounds and sheets of steel are shipped from the warehouses of the company by motor truck to the cranes and thus loaded into the railroad cars. Where a big lot is to be sent out on a train, empty cars are "spotted" conveniently along the tracks ahead of time, to take their turns at the crane.

The firm has three buildings, all near together, so little time is lost by the vehicles in running between them. The main building, four stories high, containing the executive offices and known as warehouse No. 1, is at 316 North Third Street. It has a rear entrance for motor trucks and teams on North Orianna Street. Situated diagonally across North Orianna Street from this building is warehouse No. 2 and half a block north, on the same street, is warehouse No. 3. Transportation here is highly organized.

The general superintendent, M. E. Neeley, has as his assistant in the transportation department M. J. Tierney, who acts as traffic manager. He, in turn, has two assistants. There is a head chauffeur, who oversees the motor trucks and passenger cars, is an expert mechanic and drives truck No. 4. There is also a garage and stable boss and assistant. On the mechanical side there is a master mechanic, who attends to both vehicles and buildings. He is in charge of the three mechanics assigned to each department of the business.

There are five drivers and four helpers. As previously mentioned, all the drivers are former teamsters and have learned, step by step, the differences in these modes of transportation, and just how and in what particulars motor trucks have the advantage. Each driver is a good mechanic and knows the city thoroughly.

All drivers report to the main office each morning at 7:30 to get the orders and slips for the early trips. There are usually two or three hours' work on each trip, and there is a varying number of trips daily, according to orders. The motor trucks are routed by streets for the wharf, freight station and warehouse deliveries, the nearest streets at the top of the slip pile. These are delivered to the men in order. Usually most of the motor trucks will be back by noon from the early run and may make from one to three trips in the afternoon. The drivers and helpers find the material they are to haul already assembled for them by the workmen at the plant.

Some delivery trips run as high as 20 stops and not infrequently at wharves and freight stations there are long periods of waiting in line for a turn at the platform.

Sometimes a haul to wharves will entail 20 or 25 bills of lading. There are seldom less than twelve stops on an all-round wharf trip. The average run of the various motor trucks, as already given, ranges from ten to fifteen miles a day, and while individual runs sometimes will exceed this distance, no motor truck ever goes more than thirty miles in a day. The radius of operation is short, but the material carried is heavy enough to cause considerable wear and tear, notwithstanding.

THE chief forms used in the transportation department are as follows:

Daily Service Record. This is a dated white slip, six and a half by four and three-quarters inches, and is issued to and turned in daily by the driver. It gives such data as motor truck number, number of trips and time of departure and arrival; number of delivery or "pick-up" stops; load units, both out- and inbound; helper used; trailer used; time accepted for work; time of release from work; mileage reading at finish of day's work; mileage reading at start of day's work; mileage made for the day; gasolene or k. w. h.; pints of cylinder oil consumed; lunch-time start; lunch-time finish, and name of driver. The reverse side, which is blank, is used for remarks on delays, weather, road, accidents, expense and any miscellaneous data.

Driver's Call and Return Slip. This is a white form in duplicate, six by five and a quarter inches. The top slip, with black lettering, is for the driver and bottom slip, lettered in red, is for the customer, being a record of material called for and re-

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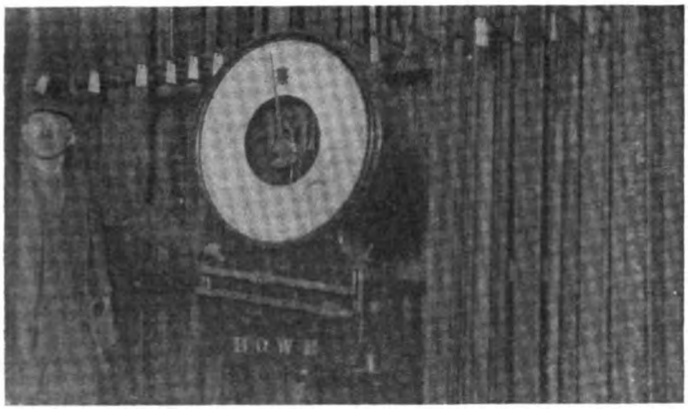
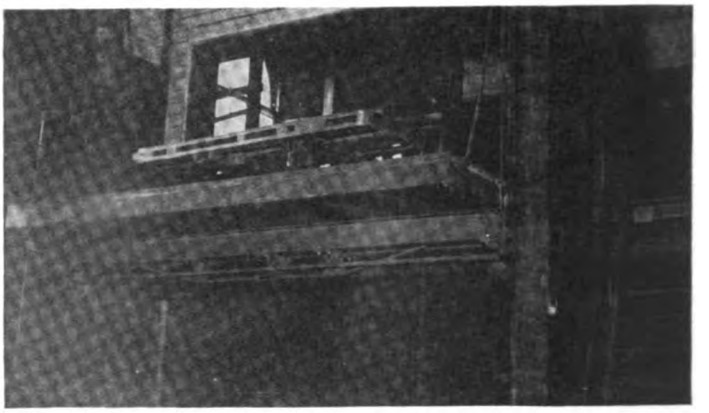


Where sheet steel is weighed.



Four-ton electric elevator.

turned. The driver returns his slip to the office.

Order Ticket. This is a yellow form of the usual type for this kind of slip. It is in duplicate and is seven by five and three-quarters inches. The top slip, with black lettering, is returned to the office by the driver and the bottom slip, lettered in red, is retained by the customer.

Bill of Lading. This is the usual triplicate kind of form—bill of lading, shipping order, and memorandum. The forms are white, seven and three-quarters inches by eight and a half.

The drivers, being mechanics, are able to effect minor repairs and adjustments on their own motor trucks without having to call on the regular mechanical force.

"Inspection overhaul" of all motor trucks is held monthly. Each machine has its particular inspection day. Tuesday is the day chosen for this work, the first motor truck to be overhauled having the first Tuesday in the month as its day, the others the following Tuesdays in the month, the fifth motor truck being inspected and overhauled on some other convenient day of the week.

This overhauling includes: Disassembling and cleaning engine; adding required new parts; lifting body from chassis; going over and polishing body and cab and scrubbing chassis; taking out motors; grinding valves; cleaning out carbon; and tightening all nuts and bolts.

In the meantime, of course, should any repair or adjustment be necessary, it is attended to. By having these Tuesday overhauls every month, the machines are kept in splendid condition at a minimum loss of work, as Tuesday is apt to be the least busy day—it just happens so in this business, as experience has shown.

The motor trucks are painted once a year, beginning in June and extending into July, as the most convenient season—that being the period when a motor truck may best be spared from work. It takes about one week to paint a motor truck. There is also a careful overhaul before painting.

The drivers and mechanics have every convenience for making such repairs as are needed on the motor trucks, trailer and passenger cars for the executive staff. In warehouse No. 2 is the bulk of the machinery for repair purposes. Here, in a shop space set aside to the right of the entrance, are a 22-inch power drill press, three power hacksaws, a cold saw and cutting and compounding implements of various sorts. In a pit beneath the flooring is stored 550 gallons of gasolene, pumped from inside the building. In this two-story building the stable is on the second floor, as already stated. As in all the warehouses, material of the firm's output is stored here.

Warehouse No. 3 is the main garage. It is one story high, with large windows and three skylights, which greatly assist in daylight washing and other work. The floor space is 45 by 100 feet. On a gallery 34 feet long, to the left, as one enters, there are lockers, and here also are placed an air compressor, electric charger for batteries, tanks and receptacles containing bolts, nuts, washers and other repair and adjustment material.

Beneath a large window, to the right of the entrance, is a notably constructed workbench, made by the mechanics at the plant. It is painted battleship gray and the locked drawers have brass handles. The key is kept by the garage boss, who issues all the repair stock in the place. The bench is equipped with the usual type of bench tools, including garage vise.

Three fuel oil tanks containing sixty gallons each are kept here. They are of the portable type. As in warehouse No. 2, beneath the floor, there is a 550-gallon gasolene tank.

In warehouse No. 1, where the bulk of the firm's iron and steel stock is stored, a 4-ton elevator, operated by electricity, is a device which saves much labor in loading. This elevator runs from the ground floor to the top of the building, or fourth story. On it are placed loaded hand trucks, one at a time, or more if required, the elevator is raised or lowered to motor truck platform height and the hand trucks, with their loads, run off the elevator upon the platforms, or bodies, and the loads then deposited.

Other labor-saving devices, more often used for loading than any other means, are two 5-ton overhead traveling cranes and one smaller hand crane. This warehouse is tracked on its first floor for hand trucks, carrying a 5,000-pound load. The method of loading the trucks in this manner is as follows:

Two narrow blocks, the width of the

Unloading steel by crane.

Loading truck with angle iron.

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hand truck platform, are placed fore and aft, within about a foot and a half of each truck end. This leaves sufficient space underneath, when a load has been deposited on these trucks, resting on the two cross-blocks, for the heavy chains of the crane to pass, so the heavy loads can be quickly swung aboard the waiting motor trucks which run into the building beneath the cranes. Sometimes this method is varied by passing between the space, between the blocks and the load parallel to the blocks, two stunt rounds of steel easily bent into hooks on the ends, to receive the chain loops from the cranes, which lift them readily, swinging them to the motor truck platforms.

The hand trucks are run in their tracks upon a scale, also tracked and even with the floor. The weight of each hand truck is known and the load weight is immediately ascertained before it is swung on the motor truck.

It takes only from two to three minutes to fully load one of the 5-ton motor trucks by means of the crane. When the big motor trucks are being loaded and are occupying the crane, the smallest motor truck, the one and a half-ton Ford, can be loaded in from seven to ten minutes. Bundles of rounds and angles are usually loaded by crane and often sheet steel is loaded by means of the elevator. The sheets, some of which are seven-eighths of an inch thick, weigh about one hundred and fifty pounds to the bundle.

On the second floor of this building is a power saw which is used largely to cut round up to eight inches. The firm has an original method of storing its sheet steel stock, upending it in narrow racks, the length at right angles to the wall, for economy of space. Each rack shows the dimensions of the stock thus stored in that particular receptacle, in stenciled white figures, at the top, or with printed tag. In this way the sheets are more easily handled by the men for getting ready to cut, or load, as well as taking up comparatively little space. Angles and rounds are both stacked and laid lengthwise. From the time the stock is first placed, everything is arranged with forethought for speed in loading and delivering.

As indicating the general cost of operation of a motor truck in this sort of work and under these general conditions, following are some interesting features from the firm's books:

OPERATING COSTS.

Four and a Half-Ton Packard, for December, 1919.

Fuel (gasolene)	$ 28.50
Oil	1.61
Wages (driver and helper)	255.84
Sinking fund (on mileage basis, charging monthly)	22.28
Maintenance and repair	18.81
Tire expense	27.23
	$354.27

Fixed Monthly Expense.

Garage rent	$ 25.00
Insurance	14.74
License	6.56
Interest on investment of $5,031.73 @ 6%	14.67
	$ 60.97

The cost, per ton-mile, of the 6-ton Packard, for 1919, is shown as follows, from February to December, inclusive:

February	$0.243
March	.373
April	.320
May	.380
June	.267
July	.263
August	.240
September	.224
October	.224
November	.165
December	.154

Thus it will be seen that the variation in cost per unit-mile for the period ranged from .154 to .380.

The record of another of the motor trucks, beginning with February, 1919, also, is as follows, showing the unit-mile cost:

February	$0.326
March	.309
April	.305
May	.311
June	.301
July	.230
August	.295
September	.259
October	.245
November	.228
December	.183

Spain to Offer Competitive Trials for Motor Trucks and Omnibuses

The president of "La Sociedad General de Automóviles," José Bosch y Pagés, Calle Casje 24, with the coöperation of other concerns interested in automotive manufactures, has arranged for a competitive trial of motor trucks and auto 'buses, to take place in Spain from June 21 to 26, inclusive.

The route selected is from Barcelona to Madrid, a distance of 438 miles, which will be covered in the six days. There will be three classes for motor trucks and two for omnibuses, as follows: For motor trucks, from 1 to 2 tons, ordinary freight; up to 3 tons, ordinary freight; more than 3 tons. For omnibuses, up to 19 passengers and 450 pounds of baggage, and up to 26 passengers and 1,100 pounds of baggage. The driver will be considered as a passenger, and a weight of 145 pounds may be substituted for each passenger, if desired.

The autobus has successfully solved the problem of communication with many districts of Spain not reached by the railways, and the motor truck is rapidly replacing horse-drawn vehicles for long hauls over indifferent roads, as well as for general trucking in city limits. Many types of motor 'buses have been in use in this country for several years, but it is only within the past two years that the motor truck has gained full recognition.

In view of the possibilities of the Spanish market for these vehicles, the projected contest would appear a favorable opportunity for American manufacturers and exporters to call attention to their lines.

Machine Makes Splendid 4-Year Record Over Maine's Muddy Roads

One hundred thousand miles over the muddy roads of Maine—and still going strong at 60 miles a day—that's the record of an Acme 2-tonner owned by W. W. Blazo, of Belfast, Maine. Belfast is not the farthest point north where motor trucks are operated, but the territory of the Belfast district, which is about 100 miles north of Portland, has a reputation for roads that is bad and the roads are about as tough as motor trucks would ever be called upon to negotiate.

And yet despite the severity of these conditions, Mr. Blazo has operated this 2-ton Acme for almost four years with a remarkable record for success. It has been used in the general hauling business, transporting everything from fruit to fire wood. It is easily averaging 60 miles daily and Mr. Blazo states that his machine to date has made over 100,000 miles.

"It has averaged a little better than 60 miles a day all summer, rainy weather taken out, while the teams average about 15 miles a day per pair of horses. We deliver on the average about eight to ten tons of goods or merchandise a day.

"My motor truck takes the place of about three pairs of horses and costs much less than team equipment. Where it only takes two to run the motor truck it takes three men to drive the teams. The net profit we receive on one day's work is about $4 outside of everything."

M.A.M.A. Plans to Organize Advertising Managers' Council

More than 50 representative advertising managers of the automotive industries attended a meeting held at the Hotel Commodore, New York, March 26, under the auspices of the Motor and Accessory Manufacturers' Association, and approved plans for the organization of an advertising managers council, as a central clearing house to handle constructive coöperative work on vital problems of mutual interest. An executive committee was appointed to formulate definite plans and policies for the council. The members of this committee are:

E. C. Tibbitts, advertising manager B. F. Goodrich Rubber Company, Akron, Ohio, (chairman).

James J. Buzzell, advertising manager, Motor Bearings Division, Hyatt Roller Bearing Company, Detroit, Michigan (vice-chairman).

James J. McQuiston, advertising manager, Westinghouse Electric & Manufacturing Company, New York City.

E. W. Krombach, advertising manager, Aluminum Manufacturers, Inc., Cleveland, Ohio.

F. C. Baldwin, advertising manager, Willard Storage Battery Company, Cleveland, Ohio.

Truck Show in Streets

A "ship by truck day" will be inaugurated in Sioux City, Iowa, May 21 and 22, sponsored by the Motor Trades Bureau. Plans will be made for a carnival and show to be held in downtown streets marked off on that day for the purposes of the occasion. Booths will be marked off along the street for the display of motor trucks of various dealers. The value of the motor truck as a shipping vehicle will be explained by posters and demonstrations.

A street dance and carnival features are expected to be added to the exposition, and the two days will be devoted to bringing the project before residents of the city and the surrounding territory.

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New Acason Line for 1920 Lays Claim to Great Additions in Power

In announcing the new series for 1920, the Acason Motor Truck Company, of Detroit, takes a unique position among the heavy duty manufacturers of motor trucks, inasmuch as it will merchandise its product on it being the "most powerful truck built in America," of the highest quality and sold on a quality instead of a quantity basis—appealing particularly to the experienced motor truck purchaser as its market.

The company will continue to build a wide range of chassis—1, 1½, 2½, 3½ and 5-ton capacities. The prices change, as well as a number of component parts, are brought up to substantiate the manufacturers' claim of being the very limit of power and ability in motor truck construction.

Timken worm axle, one-piece housing, full floating type with Timken roller bearings in both front and rear axles is continued. Ignition by Eiseman high tension magneto with impulse starter. Carbureter, Marvel, superheated by exhaust from motor.

The power plant is the new twpe Waukesha with chrome nickel heat treated steel crankshaft; aluminum, very deep rigid section, crankcase; connecting rods, 35 carbon steel, heat treated, ground round to fit bearings; bearings, reinforced back with Fahrig metal lining; cylinders, split head design, best grade of gray iron bored and ground to size; lubrication, pressure feed to all main rod and piston pin bearings; geared oil pump, 8 pounds pressure at 1000 R. P. M.

The governor is Waukesha patented, adjustable to any speed, sealed and self lubricated, built integral with motor, operating directly from timing gears.

Cooling system by fan and water pump. Radiator built-up type with detachable finned tubes. Entire system drained from one point. Protected by specially designed radiator guard.

Clutch, multiple disk inclosed in separate bell housing steel and raybestos plates. Clutch throwout bearing, lubricated by sight feed oiler on dash.

Transmission, Cotta, mounted amidships, constant mesh transmission, gears engaged by sliding dogs. Four speeds. Fitted for connecting tire power pump and power takeoff. Large inspection cover on top of case, and entire transmission can be removed without interfering with other parts of chassis.

Propellor shaft, Blood Brothers universal joints fully enclosed in leather boots packed with grease.

Steering gear, Ross worm and nut type, left-hand drive. All steering gear connections enclosed in leather boots and packed in grease.

Chassis lubrication, all points requiring lubrication fitted with Alemite system. No grease cups anywhere. Alemite grease gun giving 800 pounds pressure supplied as standard equipment.

Need for Organization

An endeavor is being made in Liverpool, England, to organize into an association distance and local haulage contractors, using either gasolene or steam-driven vehicles. There are five matters demanding immediate attention, and it is felt that as soon as the association is formed it should deal with them at once. They are: (1) Proposed taxation of commercial motor vehicles. (2) Loading and unloading delays at docks and quays. (3) Increased gasolene charges. (4) Return loads from out-towns. (5) The fixing of fair rates for distance haulage. F. A. Cawson, of the Century Motor Haulage Company, Liverpool, points out that "if motor haulage is coördinated, congestion and consequent delays in loading and unloading might be obviated, together with the evil of light running. One of the immediate effects of proper organization of the trade would be either a reduction in running costs, administrative charges and rates, or at least no increase in freight charges, which may be inevitable if present conditions continue."

Paradox In Situation

During 1919 the Mersey ferries at Liverpool, England, carried 163,000 fewer vehicles than in 1914, yet it must be pointed out that the congestion was more acute last year than ever it has been. Councillor Fletcher, of Birkenhead, states that if horse haulage had continued to the same extent as in 1914, it would have necessitated a 24 hours' continuous service to cope with the traffic between the Merseyside boroughs.

Economy is quite a different thing from mere abstinence from money spending. It is not economy to use antiquated machinery.

American Made Machines Dominate Burma Market in Far-away India

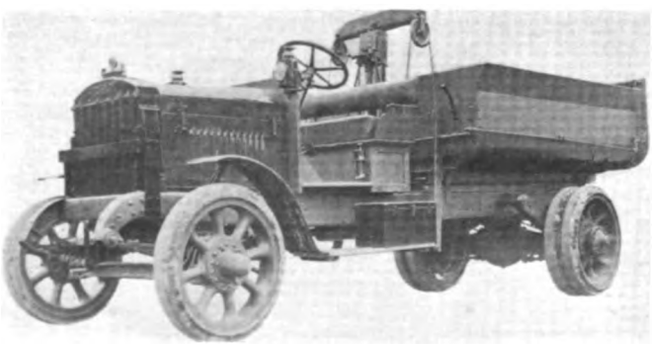
Two conditions favor the use of American motor vehicles in Burma, India, in preference to other makes: (1) Most of the purchasers are persons of moderate means, who must buy a low-priced machine, and the taxi services also employ low-priced cars; (2) the rough and hilly roads demand a car that is both light and durable. Burma has only 1,920 miles of metaled roads and 10,339 miles of unmetaled roads. The latter are often in poor condition, particularly in the delta region of Lower Burma during the rainy season. In Upper Burma the ground is generally dry and hard, and the region is hilly, so that good roads are few. Light American machines possess the cheapness and durability which make them desirable for this market.

At present there are about 1,725 passenger automobiles, 126 motor trucks, lorries, and buses, and 976 motorcycles in Burma. Motor trucks are employed by the wolfram and tin mines and rubber estates, in the oil fields, in the region of the ruby mines at Magok, for trucking in the city of Rangoon, and for transport from railway stations to seaport or river port. Most of them are of American origin, as are almost most of the passenger cars.

Imports of motor vehicles in 1918 included 149 passenger cars and 18 motorcycles; 146 of the cars were from the United States, the other 3 motor cars and all the motorcycles were from the United Kingdom. In 1917 there were 560 passenger vehicles, 26 motor trucks, and 156 motorcycles imported; 531 motor cars, 41 motorcycles and all the motor trucks came from the United States. All of the other motor vehicles imported in 1917 were from the United Kingdom or British possessions. During both these years, with the exception of the last few days of 1918, restrictions were imposed on imports of this nature.

Trucks Boost Milk Supply

Two coöperative motor truck lines conducted by farmers' associations are carrying 1,800 gallons of milk into Baltimore daily, and that city would lose 75 per centum of this supply if the farmers were compelled to go back to former transportation methods, according to a bulletin issued by the Firestone Ship-by-Truck Bureau.



New 5-ton Acason with dump body.

Acason 3-ton; transmission amidships.

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Replacing Street Cars with 'Buses

By GROVER A. WHALEN
Commissioner of Plants and Structures, New York City

PROGRESS is the legitimate issue of emergency. Certain trolley lines, crushed under the burdens of cost of tracks, conduits, power lines and equipment, plus watered stock, looted and mismanaged, ceased rendering to the public the service required by their franchise. Large sections of the public were blandly advised that they would have to walk. But they did not. They rode in 'buses. They paid the same five-cent fare and they were carried quicker. The "stand and deliver" policy of the traction interests had created an emergency out of which issued the successful introduction of the 'bus system in the city of New York.

The 'bus as introduced was a makeshift. Privately owned cars, such as could be picked up here and there, privately operated under public supervision, was at the time the only possible answer to the challenge. But even with types of 'buses not adapted to the needs of the traffic, better service was rendered the public than by the trolley cars, laid up by the receiver.

But these 'buses blazed the way for the publicly owned and publicly operated 'bus that is to solve, not one, but many problems of the congested metropolis.

There are now operating on 10 routes, over 25 miles of public highways 170 'buses, each carrying passengers at the same five-cent fare, but twice as quickly as the abandoned trolley lines.

ON September 21, 1919, the first motor 'buses were put in operation, under the supervision of the Department of Plants and Structures, on 48 hours' notice, the private operator to whom an emergency permit had been issued, having failed to supply service. Since then we have acquired a mass of experience out of which we have formulated and proved certain definite conclusions.

The outstanding fact is that the motor 'bus is more economical than the street car. The fundamental reason for this is that the only capital charge is for the 'bus and garage. Just what this means may be illustrated concretely by comparing these facts:

The surface lines of the New York Railways Company are capitalized at $503,374.32 per mile. The 25 miles of 'bus lines which we now operate can be equipped at an average cost of $22,800 per mile. Squeeze as much water as you will out of the trolley line capitalization, and you still will have a figure more than ten times the cost of establishing a motor 'bus line. The reason is obvious. As against the cost of 'buses and garage—the only capital costs in motor 'bus operation—you have to create for a trolley line not only cars and car barn, but you have to lay down steel tracks, and you have to run conduits under the tracks or wires overhead; you have to maintain the tracks and transmit the power, and you have to produce the power.

The 'bus system therefore has an economic advantage over the trolley system that makes it futile for the trolley to hope to stagger on under its heavy overhead burdens. A system that cuts its capital charge to less than one-tenth is bound to win.

Moreover there is another economic advantage in that the motor 'bus is a one-man operation. Just consider the claim of the New York Railways Company that the labor cost of surface car operation a year ago was 86.56 per centum of its entire payroll, and that this labor cost took nearly half of each nickel fare. It is easy from this to see how important is the economic advantage of substituting the one-man 'bus for the two-man trolley car. So much for the purely economic phase of 'bus operation.

WHAT the New York public is now intimately concerned with is service rather than capital charge. In this respect the 'bus not only stands up against the trolley car, but it literally runs away from it. In short it gives quicker and better service. It is a matter of concrete experience that our 'bus lines have cut down the running time between given points from 20 to 50 per centum. What this means to busy New Yorkers can not be overestimated. The idea in New York is to "get there." The 'bus gets you there while the trolley lags, halts, tarries. Five to twelve minutes saved on a trip that used to take 25 minutes means something definite and valuable to the people. Ten minutes saved in a day is equivalent to 6¼ working days saved in 300 working days. This illustrates what 'bus transportation means to the passengers.

There are reasons for this time saving that are apparent. A motor 'bus is not tied up by a block. If a trolley car breaks down the line is tied up. If a 'bus breaks down, the next 'bus swings up alongside, takes the passengers from the disabled vehicle, and goes on its way. If a street is closed by an accident, a fire, a parade, the trolley line is tied up, but the 'bus swings around the block. So much for economy and service.

Soon after the Hon. Julius M. Mayer ordered discontinuance of service on the Chambers Street Line, a motor truck broke down right on the cross-over at Park Row, blocking both tracks. The Third Avenue and Avenue B cars were tied up and stood helpless, one long line stretching back to Spruce Street, the other to Chatham Square. If the Chambers Street Line had been in operation, its cars would have piled up on either side of the motor truck. But our 'buses were operating through Chambers Street, and they just swung around the obstruction and went on their way.

The motor 'bus has the added merits of helping to solve one of the most vexatious and baffling problems of municipal administration. The rapidly increasing congestion of our highways, the retarding of traffic by such congestion, the number of accidents due to the overcrowding of the streets—these are phases of a problem intensely serious and important alike to life and to pocketbook.

The street car, operating on fixed tracks, is the basic cause of this condition which costs the people of this city unaccountable millions in loss of time and in increased costs due to the slow movement of merchandise. The traffic has to accommodate itself to the trolley car, and the trolley car in turn is impeded by the traffic owing to the fixity of its own course.

In contrast with this rigid, unaccommodating system, the motor 'bus is a flexible operation. It adjusts itself to the traffic, swings around a slower vehicle, is not impeded, and does not impede. It speeds up the traffic, instead of hindering it. The motor 'bus requires no tracks. This would permit the city to keep its streets in better order at less cost; would reduce the wear and tear on other vehicles, and diminish the number of accidents.

LOADING and unloading at the curb, the motor 'bus would remove one serious cause of congestion—the constant stopping of streams of traffic caused by the loading and unloading of trolley cars in mid-street. This, too, would have an important effect in eliminating a frequent cause of accidents by removing the necessity of people braving the current of traffic by going into the middle of the street to get on a car.

The danger, under the trolley system, has necessitated the setting aside of safety zones on the streets. With the trolley system eliminated and 'buses in operation, these zones would be unneeded, and these spaces would be restored to the roadway for the use of vehicles.

Motor 'bus operations, under public ownership and operation, will be doubly profitable to the people of the city. It will preserve to them transportation for a five-cent fare, saving the extra cents or nickels demanded by the traction interests for service over their slower and uneconomic lines. It will, moreover, earn profits for the city, and thus supply funds for needed municipal purposes which would otherwise have to be provided by taxes.

To demonstrate this point, let me cite these facts:

The city can purchase 100 motor 'buses

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with extra parts and garage equipment for $570,000.

The fixed charges, including liability insurance, interest, depreciation, and a force of 220 employes for one year will be $635,000.

With 92 'buses in operation and 6 in reserve, the 10 lines can be operated at a cost per day of fixed charges, $1,740, cost of gasolene, oil and tires, $683.20, or a total of $2,423.20.

These lines are now carrying 75,000 passengers a day. Counting 60,000, the fares at 5 cents would be $3,000.

Showing an average daily profit of $376.80, or an annual profit of $137,532.

For the purpose of this point, I have taken the well tested figures based on the actual experience of this department, and on careful estimates purposely made high on cost and low on returns. I have taken as a unit the comparatively small operations with which we are familiar, and on these operations, I confidently estimate a net profit of $137,532 per annum.

These lines, remember, replace the trolley lines that the companies regarded as most unprofitable. When we begin to operate other lines, along routes that the companies find more profitable, we may expect even larger profits, and each new line will help to swell the total of net earnings until by 'bus operation the city will be able to reduce the tax rate and lighten the burdens on real estate owners and on rent payers.

It must seem evident from these facts that the motor 'bus offers the answer to the higher fare propaganda. That answer is not "ten cents" nor "eight cents" nor even "six cents," but the same old belittled nickel. The nickel has been squeezed, but when it comes to surface transportation, the thing to do is not to take two nickels for the service one nickel has been buying, but to give a service that can be rendered profitable for the nickel—a better service, that is, a 'bus service.

Let me say emphatically that the trolley car can be relegated to the limbo of discarded things, along with the stage coach, the horse car, and the cable car; that the motor 'bus is the vehicle best adapted to the requirements of surface transportation in cities; that the motor 'bus is superior in speed, adaptability, safety and comfort, and it figures less than the trolley car, only in cost; that the solution of the transit situation in this city will ultimately resolve itself into the subways and elevated lines carrying long haul north and south bound traffic, and the 'buses, with the street cars eliminated, carrying people cross town and limited distances north and south.

It is my belief that before the end of 1920, hundreds of municipally owned and operated 'buses will be in service in the city of New York. As I have stated before, why continue an inadequate transportation system which has defaulted in its franchise obligations, when a highly profitable and improved method of transportation, by the installation of a 'bus system, can be substituted almost immediately?

Oil and Trucks Bring Water to Golden Gate

BIG AID TO HETCH-HETCHY PROJECT

In order to provide itself with an adequate water supply for the future the City of San Francisco has undertaken the world famous Hetch-Hetchy project. To provide transportation for the enormous amount of material which is being used in the construction of this project and for the small army of men engaged upon it, the City of San Francisco operates the Hetch-Hetchy Railroad.

For the purpose of providing storage for gasolene which is used in operating the fleet of automobiles and speeders of the railroad, there have been buried two 4,000-gallon steel tanks at Groveland, in such a manner that the gasolene can be delivered directly from the tank cars. The capacity of the two tanks is such that the city is able to purchase gasolene by the tankload. A special oilhouse built of corrugated iron near the buried tanks houses the oil pumps.

There are 12 speeders and several motor trucks, which are equipped with flanged wheels adapting them to be operated on the rails of the Hetch-Hetchy Railroad. There is also a compressed air tamping machine, which is self-propelled through the medium of a lever-controlled clutch on the gasolene engine, which engine also operates the air compressor. The engine and compressor are mounted on a car together with a gasolene tank and air receiver. A powerful set of brakes are provided so that the car may be quickly stopped and removed from the tracks to permit a train to pass. This is necessary because the grades are very steep. There is also a set of lifting jacks to assist in removing it from the track and in replacing it.

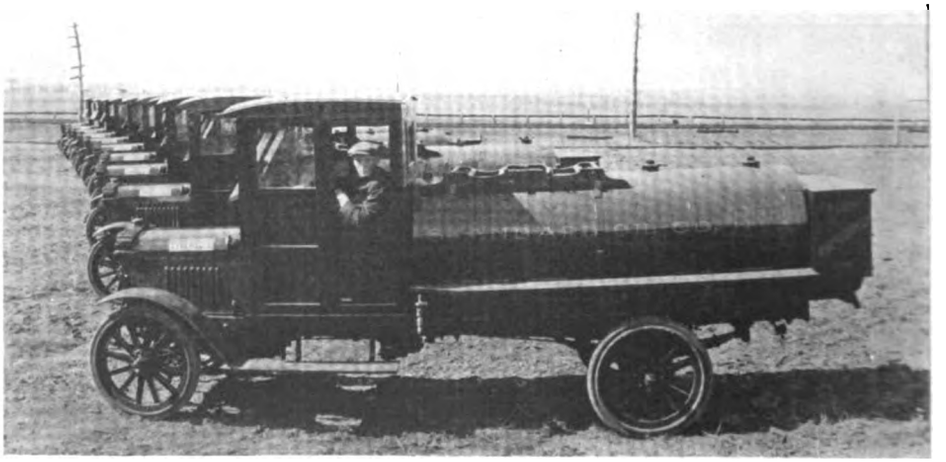
All the machinery is enclosed in a removable housing and can be locked to prevent tampering. Four pneumatic tie tampers are used and a number of 50-foot lengths of flexible hose are carried. The workmen ride on this car from the construction camp to the point where the tamping is done. The speeders carry from 6 to 7 men each, and are used extensively by the engineers and employes in moving from one point to another along the line.

The motor trucks are used for hauling express and construction material and for carrying passengers and employes. A set of pony trucks have been attached to the front of the motor trucks, which permits them to make the turns in the railroad. The machines carry their own turntable, by means of which they can be turned end for end. This is done by placing jacks under the turntable, and raising the motor trucks so that the wheels will clear the rails. A chain is attached to the front trucks and to the chassis to hold the springs from opening when the motor truck is raised. Special brakes are applied to the front trucks, and the ordinary brakes are used on the rear wheels. This makes it possible to easily control the machines on the steep grades. To add further safety, sand can be delivered onto the rails in front of the rear wheels, by means of compressed air. The sand is carried in a cylindrical steel tank attached to the side of the motor truck in front of the rear wheels. Compressed air is provided by means of a Kellogg air pump placed under the hood. By the turn of a valve the compressed air forces the sand out through a pipe leading from the sand tank. The front of the chassis is mounted on a ball-bearing center plate and the roller side bearings, which eliminate friction

Standard Buys Patriots

The Standard Oil Company of Nebraska recently placed an order for approximately two hundred motor trucks with the Patriot Motors Company of Lincoln, Nebraska. This company purchased its first Patriots over eight months ago and has kept careful cost and performance records on them since that time.

The Lincoln Models, which the Standard Oil Company has adopted, are all equipped with 500-gallon tanks with heavy mounting carefully bolted and reinforced to prevent shifting under load. These tanks contain three large compartments for gasolene, with two smaller ones at the front end for lubricating oil. The machines are also equipped with special electric headlights operated by Columbia multiple-cell batteries because of the highly inflammable cargo carried. A two-compartment bucket box is mounted at the rear of each tank.



Part of Standard Oil fleet of Patriots.

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A Plank for Political Parties

Federal Highway Council Urges, as Solution to One of Greatest National Problems, That Highway Improvement Be Placed in Hands of a Federal Highway Commission

THE Federal Highway Council, with a large national membership is now at work seeking to place before the public the necessity for national highways in such a light that the people will realize the great benefit that will be derived by the government constructing and maintaining a national system. The council also seeks to aid states in providing means and ways for building their state systems and necessary connections with the national system, at the same time aiding county officials in laying out and constructing county systems to tie up with state systems and the important towns and railroad stations of the county. It is thus hoped to provide a general system for the entire country of national, state and county highways, forming a completed plan that will afford adequate transportation for all the people.

It has been and is the policy of the Federal Highway Council to advocate a national system of highways to be built and maintained at the expense of the federal government, under the supervision of a Federal Highway Commission, and to extend and continue federal aid after 1921, thereby encouraging and assisting the states to connect up their state systems with the national system, making both more effective, and to issue such literature as may be helpful to the counties in solving their road problems.

The Federal Highway Council believes that it is the duty of the government to take over about 60,000 miles of the main highways to construct and rebuild, where necessary, as a national system, the states to take over 240,000 miles as a main state system, and the counties to take over about 300,000 miles of market county roads, making a system of about 600,000 miles of which between 200,000 and 250,000 miles have been improved, and leaving between 300,000 and 350,000 miles to be improved.

THE highway problem, during the last century, has grown so extensively that the communities under whose supervision it came could not satisfy its needs, and it was necessary for each county to try to supply the want that the community failed to satisfy. As the country developed and traffic increased, the county could not cover the broad need, and therefore state aid was extended to the county by the state. But this in turn did not satisfy traffic demands. It was not a great while before the state realized that a more powerful unit should step in and take over a certain number of miles of road and build a state system, so state highway departments were formed. The need was met as far as the state conditions were concerned, but due to the great increase of traffic brought about by the advent of the motor vehicle, the government realized that to take care of and develop interstate traffic on the highways, it would be necessary for the government to coöperate with the states by appropriating money to assist them in their road building program. Congress passed an act appropriating a large sum to assist the states in building their main roads and to establish an efficient state highway department.

Federal aid has been a great stimulant to the road building program of the country, and whereas up to the present time there has been only a limited amount of road building completed, yet a great good has been brought about by requiring the establishment of a state highway department in each state, and by encouraging the counties to enter on a larger road program. The Federal Highway Council is of the opinion that federal aid should be continued and extended until all the state highway departments have been well organized and on a firm financial and efficient basis, yet it realizes that regardless of how efficient the state highway department may be, there still exists a want that it will be impossible for them to satisfy, even with the assistance of federal aid, and that want is a national system of highways. A system to be constructed and maintained by the government under the supervision of a Federal Highway Commission, whose sole duty it will be to devote its energy and time to this work, and administer federal aid.

OFFICIALS and others concerned in highway development assert that it is impossible to expect forty-eight states and the District of Columbia operating under forty-nine different units to coördinate their plans and systems so that a national system would be constructed in the least possible time, especially when there is no one who has the power or authority to bring these forty-nine different units into accord. Each state highway department is independent to act and build the roads that will be of the greatest commercial advantage to its state, regardless of whether such road will be a link in the national system or not. It can not be expected of a state highway engineer to devote his time and energy in studying the road conditions of an adjacent state and the states beyond, which would be of great value from a national standpoint. It is his duty to devote his time and energy to conditions in his own state that will be of the greatest value locally but which may not form the main connecting link in the national system. Therefore, the council is firmly of the belief that it is the duty of the government to step in and establish a national system of highways, create a Federal Highway Commission to take charge of their construction and maintenance, and to administer federal aid. It also believes that federal aid should be extended to the states, helping the state highway departments to build up their state systems, thereby making the national system more effective and doing the greatest good. Federal aid should by all means be continued until at least this result is accomplished.

Traffic conditions on the highways that have been constructed are becoming congested, and in a few more years will be very much more so. The cost to the people of the country, due to the congestion of traffic and the bad condition of many of our important highways, will be enormous, and the development of the country will be greatly retarded, the cost of living increased, and altogether an exceedingly heavy burden will be placed on all the people.

It is therefore the opinion of the Federal Highway Council that every effort should be made speedily to enact national highway legislation, providing for the construction and maintenance by the federal government of a national system of highways, creating a Federal Highway Commission, and in 1921 make an additional appropriation for the continuation of federal aid.

Touring in France

An elaborate program, with substantial government backing, has been drawn up in France for the development of touring as a national industry. There has been in existence for a couple of years a Government Department known as the Office National du Tourisme, the object of which is to encourage the development of touring. Quite recently this office has formed the Compagnie Francaise du Tourisme, which might be described as a super Cook's agency. The Office National does not come in direct contact with the public, whereas the touring company deals directly with the traveler, without, however, entering into competition with existing agencies.

This new company unites all the railroad companies, the big hotel syndicates, the leading steamship companies, and the syndicate of touring agencies. In order to develop touring, the Compagnie Francaise du Tourisme will establish agencies and information offices in various parts of France and abroad. In conjunction with the Bank of France it has established travelers' checks, which will be procurable in all the leading foreign countries, and will be honored throughout France; it will sell inclusive tickets for a week, a fortnight, or a month in France (these to comprise railroad and motor travel, hotels, etc.); and it will advertise France as a touring center on a big scale. In this activity the motor car-a-banc naturally will play an important role.

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A. B. C. Refrigerator Trucks Solve Shipping Problems

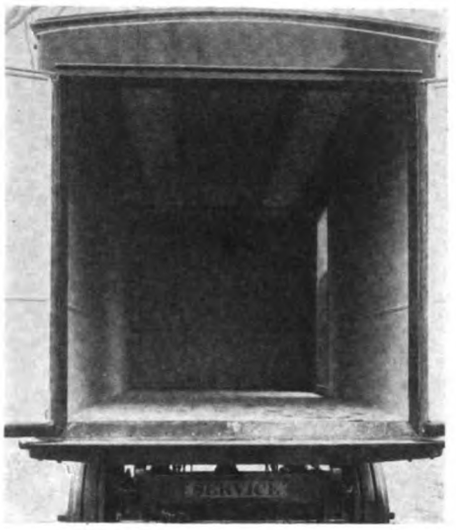
BOTH HEAT AND COLD FROM SAME SYSTEM

In the building up of the motor truck industry there is a necessary demand for an efficient means of refrigerating transportation of such commodities as perishable goods in the nature of meat, fish, butter, poultry, eggs and fruit, which are subject to the elements of the weather and which, unless properly protected, will easily spoil. Thereby they are rendered unsalable and often result in a complete loss to the shipper.

The automatic brine circulation system of refrigeration applied to motor trucks, a new invention, has obviated the difficulty in maintaining a temperature of the degree required. It is a system of simple construction and operation and is now in use by a number of corporations in some of the largest cities of the United States.

Briefly, the system consists of a brine tank constructed within the body of the motor truck, in the compartment to be refrigerated. The tank is divided in the center by a partition that contains three check valves. Ice and salt, in the proportion to be determined in accordance with the temperature desired, are placed in the tank which produces an extremely cold brine. This brine is caused to circulate by the swaying of the motor truck while in motion, through pipes hung about two or three inches below the ceiling of the compartment to be cooled, and extend from one side of the tank under the roof, horizontally, and return to the opposite side. The brine, seeking to equalize its level and being unable to pass back through the check valves into the other section, flows through the pipes and is then carried to the opposite section automatically. The longer the motor truck is in motion the colder the brine will get, although it is possible to maintain an even temperature if so desired.

It has many advantages in that it is economical, sanitary and efficient. The system deals with the body of the motor truck. It can be built on either a motor or electric automobile truck chassis, or on a common wagon (horse-driven) chassis, and can be constructed in accordance with the user's ideas as to compartment arrangement, etc. Ordinarily, two tyeps of refrigerated motor trucks are being built by the company: one for use by ice cream manufacturers, constructed as follows: A compartment for ice cream, one for customer's ice, another for salt, and a fourth for empty cream containers. The other type is termed the "General Utility" and is constructed on the principle of a refrig-



Interior View A. B. C. body.

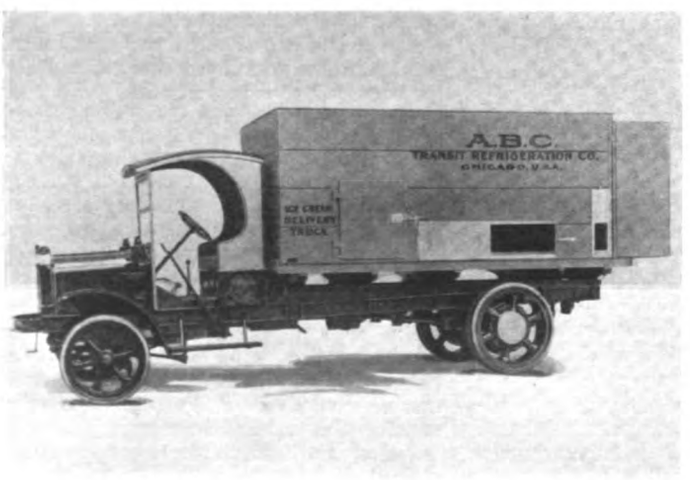
erator freight car. Any sort of perishable commodity may be transported in this type.

By reason of the fact that an A. B. C. motor truck, as it is commonly known, consumes approximately 60 to 75 per centum less refrigerating energy than any other type of machine, the economy of operation is reflected in each day of actual operation. This statement may appear out of proportion, but actual statistics in the possession of present users are *prima facie* evidence in its support. In this connection, too, time is another feature subject to economy. The driver accepting a load of merchandise of transportation loses practically no time in either receiving or discharging such load, for the reason that he is not hampered in his movements by dealing with packing of any sort, nor does he have to get his clothes wet as is generally the case when coming in contact with packing ice.

In the case of motor truck users, a distinct advantage will be immediately recognized in the following statement of facts. Salt water or brine is a potent factor in the rapid deterioration of iron and steel. With ordinary motor trucks there is every opportunity for such liquid to leak through to the chassis, causing thereby laying up of the motor truck because of necessary repairs, with its incidental loss of time and money. Not so with the A. B. C. motor truck. Brine can not come in contact with the chassis under any circumstances, which practically means doubling the life of the machine and adding to its efficiency.

Many ice cream manufacturers are effecting a saving this way. Their cans and covers for cream are not battered to pieces or deteriorated from contact with salty ice, and some have even gone so far as to discard covers, using oil paper instead, with equally efficient results. At any rate, a cheaper material for covering can be used as effectively as a heavier, more costly one, when using the automatic brine circulation system, which enables better service to the consumer because of decreased overhead expense.

A peculiar feature which adds materially to the value of the A. B. C. motor trucks is that they can be changed with little additional expense from refrigerator to heater motor trucks. When used for heat, the overhead pipes are shut off and live steam forced into the brine tanks through pipes extending downward on the sides of the walls under the floor and returned to the tank. The principle of operation is precisely the same as when ice and salt are used, in that the heated brine is caused to circulate by the swaying motion of the vehicle, automatically, and is kept in constant circulation. A temperature proportionate to the degree required by the commodity being transported can be maintained throughout the trip without difficulty. In the center of the motor truck in either instance, weather hot or cold, the temperature will be found to be approximately the same as in all other portions of the body, a feature



A. B. C. ice cream truck.

A. B. C. 3½-ton general utility truck.

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requisite to the proper transportation of perishable commodities.

From a sanitary standpoint, the advantage of having the entire body enclosed is recognized at once. Flies and other pests and the elements are absolutely insured against. Contamination is impossible. If the user or consumer of your products can be given this guarantee his trade will be permanent.

There are many other advantages which would require pages to tell, but one more point is called to attention. The neat appearance and sanitary appearance of the A. B. C. motor truck arouse instantaneous approval on the public's part, which in proper sequence is traceable to the user's immediate benefit. One enthusiastic owner has termed the A. B. C. a moving billboard.

Pick Universal Joint After Four Years' Test Is Placed on Market

The new Pick universal joint, made at West Bend, Wisconsin, is based on a sliding block principle, combining strength with flexibility. The propeller shaft is held between four segments which form a rectangular bore. These segments rest on four bearings, each a quadrant, and all parts slide and twist within a drop-forged steel body. Body, flanges and housing are held together by eight bolts. The segments and bearings are of high-test heat-treated alloy steel. The four arcs of the bearings form a perfect circle, and thus eliminate all binding. The segments slide one way and drive the other—free motion in every direction. The propeller shaft is free to slide the entire length of the bore. There is full flexibility in every direction.

The Pick joint has large bearing surface and therefore exceedingly low pressure per square inch. The same bearing pressures are maintained at all positions of the drive by the equalizing action of the joint. Every part is in direct shear. Strains are centered and are applied where resistance is greatest. The entire construction is exceedingly compact and strong. Constant lubrication is assured. Centrifugal force throws the lubricant outward to the moving blocks and the working action of the joint keeps every bearing surface in actual contact with the lubricant. A series of tightly fitted steel stampings forms a simple yet highly effective retaining device which keeps every particle of grease inside the joint, as well as keeping dirt and foreign matter out.

The automotive engineers who designed this joint have been making experiments and tests for the past four years, before they were satisfied that it met every requirement fully. The final product had to stand up under the most severe tests that could be devised, such as running without lubrication for thousands of miles, and including every kind of twist and shear, before it was decided to place it on the market. The Pick universal is being manufactured in a modernly equipped plant, where engineering standards and the latest automotive production methods prevail. A number of different sizes are being manufactured adapted to passenger cars and motor trucks of varying capacity.

Truck Transportation Aid To Florida Farms

Ship-by-Truck Routes Are Bringing Efficient Service to Shippers Throughout State

SINCE the establishment of the Firestone Ship-by-Truck Bureau in Jacksonville, Florida, last October, great interest has been aroused in truck transportation all over the state. A number of large and successful motor truck transportation lines have been promoted and aided by the Jacksonville bureau. Within thirty days after the bureau was established, two lines began operating out of Jacksonville; one, a line of 38 miles to St. Augustine, the oldest city in the United States, settled by the Spanish in 1513, and another to Daytona and Sanford, a distance of 158 miles. Both of these lines operate daily, hauling light freight and perishables from the wholesale firms in Jacksonville to the large tourist hotels and retail merchants in the coast towns. On return trips they carry fruit and vegetables to the produce houses in Jacksonville.

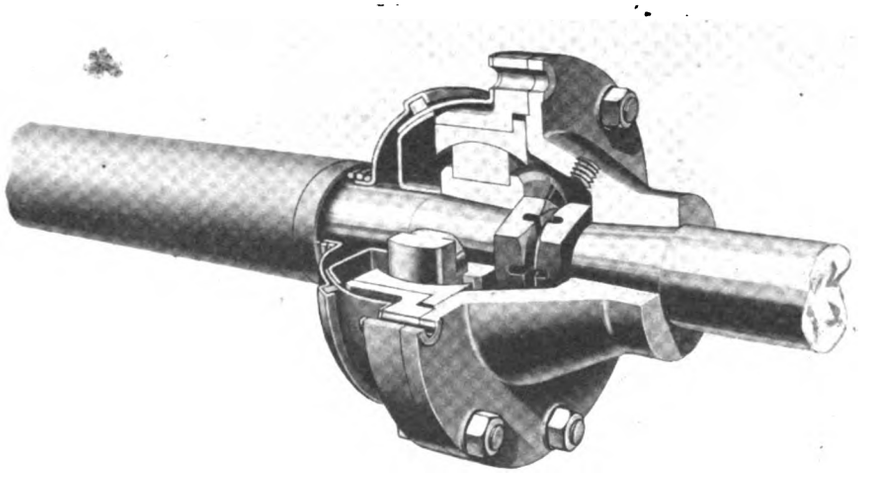
Negotiations are in progress to operate a motor truck line south, from Daytona to West Palm Beach, where a line runs through Miami to Florida city. When this connection is made, the entire East Coast south from Jacksonville will be on a route operating daily.

The East and West coasts are connected by a line running southwest from Sanford through the center of the state to Tampa on the southwest coast. From Tampa another line operates daily connecting 20 small towns within 60 miles. The development of good roads throughout the eastern, central, and southern part of the state during the past two years, has been rapid and substantial. While most Florida roads were built for tourist automobile travel, appropriations for better and wider roads are being made in order to accommodate motor truck transportation.

The Firestone Ship-by-Truck Bureau has given wide publicity to the slogan "Build Roads for Business," which is having its effect in creating a demand for sixteen-foot roads. Recent appropriations and specifications indicate that Florida roads in the future will be built to accommodate motor trucks, as well as auto travel.

The highway along the East Coast, known as the Dixie Highway, is one long beautiful roadway through hundreds of orange groves, by the side of the peerless Indian River, through semi-tropical jungles, avenues of stately palms and massive oaks, hanging with Spanish moss, which makes it probably the most popular highway in the country. Various materials are used to make up this wonderful road. Oyster shells in some portions, brick to a large extent, macadam and other materials are used. From Daytona south for 20 miles, nature has provided the most wonderful natural roadbed in the world. When the tide is out, the beach becomes a hard smooth surface, 300 feet wide, without a turn. It is over this natural race-course that motorcycle and auto races are held every year, and frequently world's records are broken.

Motor truck parades in Jacksonville, Miami, and Tampa recently, have impressed upon shippers, manufacturers and farmers, the value of motor truck transportation. Receiving stations for motor truck lines have been established in many towns, where shipments are left for the lines by farmers along the route, and where they may call for shipments consigned to them, without the machine having to make a trip off the main highway. The idea of shipping by motor truck has spread to such an extent that it has become necessary to establish a sub Ship-by-Truck Bureau in Miami. It has become almost a daily occurrence for motor truck agents, salesmen, or dealers, to refer interested prospects to the Jacksonville Bureau for further information regarding the possi-



New Pick universal joint.

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bilities of operating a line in some sections of the state.

Several incidents recently indicate how widely advertised the Ship-by-Truck movement is growing. Mr. Fuller, manager of the Jacksonville Ship-by-Truck Bureau, was called on the telephone by a woman who wanted to know if she could ship her two small boys and a trunk by motor truck, as she wanted to be sure they would arrive at their destination safely. Another inquiry was received regarding a through route by motor truck to California. Even Mr. Rockefeller knows what motor truck lines operate in Florida, as he has consigned his household goods for shipment to his winter home in Orlando by way of steamer from New York to Jacksonville, and the Dixie Highway Transportation Company from Jacksonville to Ormond. The possibilities for rapid extension of motor truck lines in Florida is as great as that of any state in the country, Florida having a mild climate with good roads for the most part, and being almost a sea level state make favorable natural conditions. From a reliable source comes the information that three-fourths of the fruit and vegetable crop will be moved by motor truck this year. This information indicates that motor truck transportation is a boon to the Florida farmer.

Recently the Firestone Ship-by-Truck Bureau at Akron conducted a study of the use of motor trucks on the farm, and as a result of this investigation, have published a bulletin entitled "Ship-By-Truck Among Farmers Through Co-Operative Associations." This bulletin is a presentation of operations and accomplishments of two farmers' coöperative motor truck associations, together with suggestions showing how and when to establish similar associations. The Jacksonville bureau, in order to bring to the aid of the Florida farmer ship-by-truck lines in uncovered sections recently mailed this bulletin and a questionnaire to farmers and commercial organizations. The response received indicates strongly that motor truck lines operating over regular routes on fixed schedules, giving a daily express service between cities, is greatly desired by both the farmers, merchants, and civil organizations, throughout the state.

Supplants Locomotive

Having proved its ability to effectively supplant the horse for commercial work, the motor truck is now proving its ability to do the work of the steam locomotive. The Northwestern Pacific Railroad has converted a 3-ton F W D motor truck into a "truck locomotive" in its work on the construction of a tunnel at San Rafael, California. The machine, which was purchased primarily for this work after tests and investigation had been made, is in daily service, hauling loaded flat cars out of the tunnel to a dump a mile distant.

The Goodyear Tire & Rubber Company receives and answers from 15,000 to 18,000 letters a day—as much mail as would be handled by a postoffice in a city of 30,000 people. At this rate nearly 6,000,000 pieces of mail are received and sent out every twelve months.

Motor Truck Boom Looms in Freight Car Shortage

RAILWAYS YEARS BEHIND IN EQUIPMENT

WASHINGTON, D. C., April 23.—Freight car shortage, even more than the exigencies of any temporary railroad strike, will give motor transport its great opportunity in 1920. This is the deliberate judgment of the foremost specialists of the Interstate Commerce Commission and the American Railroad Association. The government experts concede that the "outlaw" railroad strike, fleeting as it was, brought new evidence of the value of the motor truck as an emergency transportation utility, but their feeling is that as tangible and lasting aid to the industry this will bear no comparison with the opportunity for sustained service—the prolonged service that grows into a habit with the users—which results from the car shortage which afflicts business America.

According to the view of qualified students of transportation conditions, it may well happen that for every shipper who is converted to the permanent use of motor trucks by experiences during the railroad strike, there may be ten shippers who will gradually turn to motor trucks in despair over the car shortage. Federal car service specialists declare there is absolutely nothing for it but that the United States must accustom itself to "short rations" in car supply for several years to come. The present congestion at terminals may be relieved; the practice of some merchants of using box cars as warehouses, instead of unloading promptly, may be broken up; and the government's lately inaugurated measures may bring about the return to points of origin of cars that had gone far afield under the pooling arrangements of the United States Railroad Administration; but with the success of every expedient for making the most of the cars in commission, car shortage will persist as an aching void.

The secret, if it can be denominated a secret, of the situation is found in the circumstance that there is in the United States and is likely to be for some time to come, a formidable, actual physical shortage of freight cars. Estimates of the extent of this shortage range all the way from several hundred thousand to several million. Whatever the exact proportions it is sufficient to insure ample occupation for any instrumentality that can serve as a substitute in supplying transportation.

When the business community was in the throes of the railroad strike there were not a few business men who were eager to lease or otherwise contract for motor truck service at almost any price, but, who, apparently, gave little thought to the purchase outright of motor trucks for permanent service. It is probable, in the estimation of federal transportation authorities that there will be a different attitude toward motor truck ownership in many quarters when it dawns upon business men that the car famine is not a dilemma of today and to-morrow but a complication for this entire year and several years to come. There has been a disposition on the part of our naturally optimistic business men to assume that the sick transportation situation would recover just as soon as the railroads escaped from government management and got back into the hands of private owners. To their disillusionment these business men will find that car shortage is chronic. Nor is the reason far to seek.

It has been estimated by men of experience that the railroads of the United States ought to add about 125,000 cars every year in order to replace worn-out rolling stock and take care of the natural increase of traffic that comes with commercial development and the increase in population. In the face of this obligation what do we find? We behold scanty orders for new cars in 1916 and 1917 because the railroads were waiting for prices to come down. In 1918 orders were placed for 100,000 new cars, not all of which have yet been delivered. In 1919 no orders whatever and in 1920 the orders to date do not aggregate to exceed 20,000 cars, a large proportion of which total comprises refrigerator cars. With additions to rolling stock thus restricted over half a decade and with a large proportion of the cars in service rapidly approaching the age at which they must be retired (the more so because of strenuous use during the war), it requires no fertile imagination to see not merely an opportunity but an actual need for supplementary transportation resources.

The increase in the cost of gasolene which enters into motor truck operation, if not already discounted, will shortly be more than matched by increases in both freight and express rates which are inevitable in the near future. Incidentally it is assumed that freight car shortage and the higher rates that impend will cause the motor truck industry to, whenever practicable, lean more pronouncedly than ever to the drive away system for deliveries to customers.

Corrections

The following corrections of errors in the 1920 edition of the POWER WAGON REFERENCE BOOK should be made:

Pages 89 to 99 (right-hand only).—The headings in section 8 have been transposed and should be corrected in the following manner:

(1) The heading which reads, "Make of brake lining," should be above the fourth column of the section instead of in its present position.

(2) The heading which reads, "Number of pieces of lining and length of each required for service and emergency brakes," should be above the second column of the section instead of in its present position.

(3) The heading which reads, "Width and thickness of lining required for service and emergency brakes," should be above the third column of the section instead of in its present position.

These corrections apply to pages 89, 91, 93, 95, 97 and 99.

Page 879.—Fuller & Sons Mfg. Co. should be listed as on page 30 instead of 130.

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Building Roads for Motor Trucks

By T. R. AGG

Professor of Highway Engineering, Iowa State College, Ames, Iowa

MOTOR transport as an agency for the distribution of commodities has become a recognized part of the transportation equipment of American commercial life. The continued development and extension of motor truck haulers seems destined to usher in an era of readjustment in the transportation field in the United States, comparable only to that during which the railway system of the nation was being constructed.

In a utility so comparatively new as the motor vehicle, it is not reasonable to suppose that either the vehicle or the highway constructed for its use has been perfected. Improvements and adaptations of both may be expected to be numerous and of widespread influence on transportation efficiency.

Up to the present time the most important use of the motor truck outside of the cities has been as a supplement to rail transportation, the vehicles operating on routes paralleling the rail lines. The extent to which this will be profitable in times of normal rail facilities will depend upon many factors, one of which is the availability of paved highways of low tractive resistance and economical grades. The other factors are of an economic character and need not be discussed herein.

Another important field of motor trucks is on transportation routes that open up territory or connect terminals not served by direct rail connections. Too little attention has generally been given to this possibility in laying out systems of state and county highways for improvement, in that too small a mileage of roads of this class have been provided.

FINALLY, motor transport will be employed for farm-to-motor traffic on a vastly greater scale than at present. In this use the motor truck will to a great extent supplant the horse and the land now given over to supporting draft animals will produce human food which will all be needed. In very many states, especially those that are agriculturally productive, this development of traffic awaits only the building of suitable highways.

The continued successful utilization of motor transport for any purpose must depend upon ultimate economy, and this factor will be influenced very largely by the type and location of the highways constructed and the condition of serviceability in which they are maintained. It is accepted that the highway engineer must do his part if full advantage is to be taken of motor truck transportation.

In a broad sense, the construction of roads for motor truck traffic involves the adopting of types of improved surfaces, based on appropriate economic considerations, financing by methods that will distribute the costs in an equitable manner and accomplishing the actual construction in accordance with accepted practice in highway engineering, so far as practice has become standard, and blazing the trail wherever research and experience indicate the possibility of improved methods.

Economic considerations of great complexity are in the selection of the type of improvement best suited for motor truck roads, but economics too often play no part in the selection. There probably are settled convictions in the minds of many engineers and there certainly are in the minds of many laymen, as to the best type of surface for the highway that is to be used by the motor truck. But accurate data bearing on the subject are almost entirely lacking in the records of American highway engineering. The cost of transport on surfaces of various types has not been determined in a scientific manner, taking into account time, fuel costs and costs of vehicles maintenance. The cost for fuel on each of the more common types of surface is known to vary materially, but exact figures have been determined in a comparatively few cases. These considerations would be determining factors in those instances where the prices of several types of surface were nearly the same.

OF greater importance than cost of maintenance of vehicle is the cost of maintenance of the roadway surface, or more properly, the annual cost of the roadway surface during its useful life. A study of the records of initial cost of road surfaces and of the cost of maintenance and the useful life of the surface leads one into a maze of conflicting figures. Each set of data is vouched for by those responsible for its promulgation, and yet all can not be given equal weight. There must be accumulated a comprehensive record of these costs, based on uniform methods of accounting and reporting throughout the United States and accompanied by careful records of tonnage of traffic, before the engineer will have at hand sufficient data for the selection of the most economical types of roadway surface. Some state highway departments have made a start on such tabulations, but the records are, as yet, too few to be of much use to the engineer.

The financing of extensive surfacing projects involves very large sums of money and conditions during the past few years have been favorable to highway financing so that comparatively little difficulty is experienced in obtaining money for road improvement. Looking to the future, however, it must be apparent that the completion of the projects now in contemplation in the United States will involve such enormous sums of money that a foundation of sane financing must be laid at the earliest possible moment. This is particularly true now that it is so generally recognized that an appreciable percentage of the highways of the nation must be constructed of such a character that they will be adequate for motor transport, of both high-speed passenger vehicles and slower speed, heavy freight vehicles. Construction of this character is costly, although the cost is probably far below the actual benefit to the communities traversed.

It may be within the province of this article to mention briefly some factors that can properly be considered to have a bearing on the determination of a rational system of financing state-wide highway improvements.

IT is believed that a system of financing that is in a general way based on distribution of cost according to benefits is justifiable and will be proof against claims of unjust discrimination in taxation for road improvement. The almost insurmountable difficulty lies in devising a means for determining where the benefits fall or the extent of the benefit in any direction.

Probably no one questions that an area that is liberally served with railroad facilities derives therefrom a community benefit that may seem to be somewhat intangible, yet is nevertheless real. The benefit becomes apparent when such a community is compared with one not so favored. In the same way, the construction in any community of adequate highways of year-around serviceability for motor transport confers a real benefit on that community. A part of the cost of such an improvement might therefore properly and equitably be paid from general taxation in the district served. But the possibility of the district profitably utilizing the facility will vary greatly with the nature of the industries in the district, and it is doubtful if any fixed percentage to be assessed as a general tax would be equitable for an area even as large as a state. Differences in assessed valuation of land would, however, tend to equalize taxation to a great extent even though the rate of taxation is uniform.

There is also a direct and tangible benefit conferred on agricultural land by the construction of improved roads contiguous thereto. Lands on good roads are worth more than those not so situated and will actually sell more readily and at a higher price. The land can actually be made to show better profits when located on a good road than when not so located, because of the greater facility with which it can be operated. Therefore a certain part of the cost of durable improvements can rationally and fairly be assessed against such lands. The percentage of the

Presented at the Annual Convention of the National Highway Traffic Association, Chicago.

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cost to be so assessed is not easily determined, but certainly should not in many cases exceed 25 per centum of the total cost.

It probably will be admitted that the most apparent and tangible benefit from road improvement accrues to those who actually travel the highways for business or pleasure, and since about 95 per centum of the tonnage of the nation's highways is made of various classes of motor vehicles, it follows that to them the benefit of improved roads is most apparent. The cost for fuel, for vehicle upkeep and the saving in time on improved roads are real and measurable benefits. Some tests of a preliminary nature were made at Ames to determine the difference in gasolene consumption on various types of surface. While these were too few in number to be conclusive, they indicated 20 per centum as the possible saving between an average earth or gravel road and a high-class paved surface. This would mean a saving on motor operation in Iowa of upwards of three million dollars a year. It is equitable to require the owners of motor vehicles to contribute somewhat to the cost of the improvement of the highways and very largely to the cost of maintenance. This has been recognized in recent legislation in several states.

THE amount that is added to the cost of a road because it must accommodate motor truck traffic can hardly be taxed against other than owners of motor trucks, and it would seem probable that in the future both motor trucks and passenger vehicles will be required to bear an increasing portion of the cost of road construction and maintenance.

In the whole problem of highway finance, it is necessary to recognize that a roadway is being provided as a transportation facility that is not operated for direct income and the incentive to keep accurate account of the use of the facility in order to place the cost where the benefit is realized as lacking. Nevertheless, the great highway system desired by all progressive citizens can never be fully completed and maintained unless the financing is placed on a sound economic basis.

In the design of highways for motor transport the engineer is confronted with a problem for which he lacks some of the fundamental data for a complete solution. To begin with, he can not predict with any assurance the size or weight of the vehicle for which he must provide, yet it is essential to an adequate design to know the maximum load for which provision must be made. It is for that reason that steps are being taken looking toward legal standards for the size and weight of motor vehicles.

Neither does the engineer know a great deal about the supporting power of soils under road slabs or the structural strength of road slabs of various designs. In these matters experience affords some guide to the establishment of the proper design, but refinements of design that would lower the first cost are entirely within the range of possibility. In this field some investigations of great value have been completed, but much additional information is greatly needed.

In the field of railway engineering the relation between grade and curvature of the line and the cost of operation is fully established and when the tonnage of traffic is known, the justifiable expenditure for lowering grades or eliminating curvature can be computed. In the highway field no such data have as yet been obtained, and the design of grades and alinement of highways for motor transport is necessarily based on unsubstantiated assumptions.

IT may be permissible to digress from the subject long enough to call attention to the recent organization by the Division of Engineering of the National Research Council of a National Program of Highway Research. The establishment of a scientific basis for highway design is a prerequisite to the economical expenditure of the funds necessary to provide an adequate national highway system. The step taken by the National Research Council will, if properly supported, supply the needed data and every organization desiring to advance the highway movement should lend support to the Research Council in carrying out the ambitious program upon which it has embarked.

Notwithstanding the handicaps under which highway engineers have worked in the matter of fundamental data relative to the construction of road surfaces for motor transport, very great progress has been made during the past five years. It may be pertinent to point out the trend in design at the present time.

Widths: The standard double-track width has been increased from 14 feet, the common width a few years ago, to 18 or 20 feet. The allowance per line of traffic has been increased from 8 to 9 feet. The width provisions have become more liberal in that almost no single-track roads are being considered for the main routes of travel and near populous centers many sections of three-track road have been built.

Alinement: Recognition is being given to the desirability of furnishing direct routes and shortening distances wherever possible. Pleasure traffic is not so much benefited by this as is business traffic. On busy routes a saving of a mile in traveled distance between towns represents in a year a very appreciable saving in time and in operating cost for the vehicle.

Safety considerations have also entered into the design to a marked degree and dangerous sections of road are being eliminated by relocations or by extensive grading. The elimination of short-radius curves and the superre-elevation of the paved surface on the curve are additional safety precautions that are being generally adopted. A great many railway grade crossings are being eliminated and where that is impossible, suitable warning signs are being posted. Guard rails for protection on fills are standard for main highways.

Surfacing: The lessons of the past few years relative to the disastrous results that follow covering up poorly drained subgrade have been unmistakable. It seems now to be recognized that even a rigid pavement can not give maximum serviceability when placed on a poorly prepared earth subgrade. The trend is therefore toward much more extensive and costly drainage work preliminary to the surfacing, but it is believed that money so expended adds very materially to the useful life of the wearing surface and is a justifiable expenditure.

In addition to the added care in the preparation of the earth foundation, heavier road slabs are being employed in many states and it is believed that this tendency is in the right direction. Wherever it is likely that motor truck traffic will develop, and apparently that is wherever roads are provided that will accommodate motor truck traffic, the accumulated experience of the past five years points clearly to the ultimate economy of heavy slabs.

INCREASING attention is being paid to securing surfaces that are smooth, with a view to minimizing the effect of the impact of heavy loads. If the road surface is even slightly uneven disastrous pounding occurs when the motor truck travels at normal speed. This is a cause of rapid deterioration to both machine and road surface. As time passes it may be expected that the speed of freight vehicles will increase, and while pneumatic tires will do a great deal to minimize impact, every reasonable precaution must be taken to secure smoothness of wearing surface.

Maintenance: A very general recognition is being given to the necessity for effective maintenance. No matter how admirable may have been the construction, a road surface subjected to motor truck traffic will not give a maximum of serviceability unless systematic and timely maintenance is provided. It will bear constant reiteration that nowhere is the old adage, "A stitch in time saves nine," more applicable than in highway maintenance. Patrol systems and the gang method have been developed to a high state of efficiency and the high degree of serviceability of a new road is maintained without marked depreciation for long periods of time. Timely maintenance if carried out persistently for a period of years probably costs less than spasmodic efforts to make repairs at irregular intervals and certainly continuous maintenance results in the greatest average serviceability.

Long Period Costs Factor

"It is not the purchase price, but what it costs to haul loads over a period of years that determines a motor truck's economy in owner-service," says Charles B. Voorhis, vice-president and general sales manager of the Nash Motors Company. "Permanency of relationship, protection by the manufacturer of the good-will in his product and facilities for prompt and efficient service are points which users of motor truck transportation are coming more and more to look for."

Farmers are buying motor trucks to haul their own goods to market, instead of letting the other fellow do the hauling. Result—one man less to pay profits to.

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MOTOR TRUCK SPECIFICATIONS

Major Specifications of Internal-Combustion and Electric Trucks Grouped According to Load-rating and Arranged Alphabetically According to Brand-name

MOTOR TRUCK MANUFACTURERS

(Brand-names in bold face type.)

A

(Brand-names are in bold-face type.)

Abbott-Downing Truck & Body Co. See Concord.

Acason Motor Truck Co., Detroit, Mich.—1, 1½, 2½, 3½ & 5-ton.

Ace—American Motor Truck Co., Newark, O.—1½ & 2½-ton.

Acme Motor Truck Co., Cadillac, Mich.—1, 1½, 2, 3½ & 5-ton.

Air-O-Flex Auto Corp., Detroit, Mich.—1½-ton.

All-American Motor Truck Co., Chicago—1-ton.

All-Power Truck Co., Detroit, Mich.—3½-ton.

All Steel Truck Co. See Pioneer.

American Commercial Car Co. See Wolverine.

American Motor Truck Co. See Ace.

American Truck & Trailer Co. See Atco.

American & British Mfg. Co. See A & B.

Apex—Hamilton Motors Co., Grand Haven, Mich.—1, 1½ & 2½-ton.

Armleder Co. (O.), Cincinnati, O.—2½ & 3½-ton.

Atco—American Truck & Trailer Co., Kankakee, Ill.—2-ton.

Atlantic Electric Vehicle Co., Newark, N. J.—1, 2, 3½, 5 & 6-ton electric.

Atlas—Martin Truck & Body Corp., York, Pa.—¾-ton.

Atterbury Motor Car Co., Buffalo, N. Y.—2½, 3½ & 5-ton.

Autocar Co., Ardmore, Pa.—2 & 3½-ton.

Autohorse—One Wheel Truck Co., St. Louis, Mo.—5-ton tractor.

Available Truck Co., Chicago—1½, 2, 2½, 3½, 5, 6 & 7-ton.

A & B—American & British Mfg. Co., Providence, R. I.—3 & 5-ton.

B

Beck-Hawkeye Motor Truck Works, Cedar Rapids, Ia.—1½, 2, 2½ & 3½-ton.

Beech Creek Truck & Auto Co., Beech Creek, Pa.—3-ton.

Bell—Iowa Motor Truck Co., Ottumwa, Ia.—1½ & 2½-ton.

Belmont Motors Corp., Lewiston, Pa.—½, 1, 2 & 3½-ton.

Bessemer Motor Truck Co., Grove City, Pa.—1, 1½, 2½ & 4-ton.

Bethlehem Motors Corp., Allentown, Pa.—¾, 1½, 2½ & 3½-ton.

Betz Motor Truck Co., Hammond, Ind.—2½-ton.

Bollstrom Motors, Inc., St. Louis, Mich.—5-ton.

Brinton Motor Truck Co., Philadelphia, Pa.—2-ton.

Briscoe Motor Corp., Jackson, Mich.—1-ton.

Brockway Motor Truck Co., Cortland, N. Y.—1½, 2½, 3½ & 5-ton.

Buckeye Mfg. Co. See Lambert.

Buick Motor Co., Flint, Mich.—½-ton.

C

Cameron Motors Corp., New York City.—1-ton.

Champion—Direct Drive Motor Co., Pottstown, Pa.—1,200-pound.

Chicago Motor Truck, Inc., Chicago.—1, 1½, 2½ & 3½-ton.

Clydesdale Motor Truck Co., Clyde, O.—1, 1½, 2½, 3½ & 5-ton

Collier Motor Truck Co., Bellevue, O.—1, 1½ & 2-ton.

Columbia Motor Truck & Trailer Co., Pontiac, Mich.—1 & 2½-ton trucks and 3 & 6-ton tractors.

Comet Automobile Co., Decatur, Ill.—1½-ton.

Commerce Motor Car Co., Detroit, Mich.—1 & 1½-ton.

Commercial Car Unit Co. See Keystone.

Commercial Truck Co. of America. See C. T.

Concord—Abbott-Downing Truck & Body Co., Concord, N. H.—1½ & 2½-ton.

Conestoga Motor Truck Co., Lancaster, Pa.—¾, 1 & 2-ton.

Corbitt Motor Truck Co., Henderson, N. C.—1, 1½, 2, 2½, 3½ & 5-ton.

Corliss Motor Truck Co., Corliss, Wis.—½-ton.

Couple-Gear Freight-Wheel Co., Grand Rapids, Mich.—5 & 7-ton internal-combustion and 3½, 5 & 7-ton electric.

C. T.—Commercial Truck Co. of America, Philadelphia, Pa.—½, 1, 2, 3½ & 5-ton electric.

D

Dart Motor Truck & Tractor Corp., Waterloo, Ia.—1, 1½, 2½ & 3½-ton.

Day-Elder Motors Corp., Newark, N. J.—1, 1½, 2, 2½, 3½ & 5-ton.

Dearborn Truck Co., Chicago.—1½ & 2-ton.

Defiance—Turnbull Truck & Wagon Co., Defiance, O.—1½ & 2-ton.

De Kalb Wagon Co., De Kalb, Ill.—2 & 2½-ton.

DeMartini (F. J.), San Francisco, Cal.—1, 2, 3½ & 4-ton.

Denby Motor Truck Co., Detroit, Mich.—1, 2, 2½ & 3½-ton.

Dependable Truck & Tractor Co., Galesburg, Ill.—1½ & 2½-ton.

Diamond T Motor Car Co., Chicago.—1½, 2, 3½ & 5-ton.

Diehl Motor Truck Works, Philadelphia, Pa.—1-ton.

Direct Drive Motor Co. See Champion.

Dispatch Motor Car Co., Minneapolis, Minn.—¾-ton.

Doane Motor Truck Co., San Francisco, Cal.—6-ton.

Dodge Brothers, Detroit, Mich.—½-ton.

Dorris Motor Car Co., St. Louis, Mo.—2 & 3½-ton.

Douglas Motors Corp., Omaha, Neb.—1½, 2 & 3-ton.

Duplex Truck Co., Lansing, Mich.—1½ & 3½-ton.

Duryea Motors Co., Philadelphia, Pa.—½-ton.

E

Elmira Commercial Car Co., Elmira, N. Y.—1½-ton.

Erie Motor Truck Co., Erie, Pa.—1½, 2, 2½ & 3½-ton.

Evans Truck & Axle Co. See Wells.

F

Fageol Motors Co., Oakland, Cal.—1½, 2½, 3½ & 5-ton.

Famous Trucks, Inc., St. Joseph, Mich.—1-ton.

Fargo Motor Car Co., Chicago.—2-ton.

Federal Motor Truck Co., Detroit, Mich.—1, 1½, 2, 3½ & 5-ton trucks and 6-ton tractors.

Ford Motor Co., Detroit, Mich.—1-ton.

Forschler Motor Truck Co., New Orleans La.—1½, 2 & 3-ton.

Four Wheel Drive Auto Co. See FWD.

Fulton Motor Truck Co., New York City.—1 & 1½-ton.

FWD—Four Wheel Drive Auto Co., Clintonville, Wis.—3-ton.

G

Gabriel Motor Truck Co., Cleveland, O.—1, 2 & 4-ton.

Garford Motor Truck Co., Lima, O.—1¼, 2, 3½ & 5-ton.

Gary Motor Truck Co., Gary, Ind.—1, 1½, 2½, 3½ & 5-ton.

General Motors Truck Co. See GMC.

Geneva Wagon Co., Geneva, N. Y.—¾-ton.

Gersix Mfg. Co., Seattle, Wash.—2½-ton.

Giant Truck Co., Chicago Heights, Ill.—1, 1½, 2 and 3½-ton.

GMC—General Motors Truck Co., Pontiac, Mich.—¾, 1½, 2, 3½ & 5-ton.

Graham Brothers, Evansville, Ind.—1½-ton.

Gramm-Bernstein Motor Truck Co., Lima, O.—1½, 2, 2½, 3½ & 5-ton.

Grant Motor Car Co., Cleveland, O.—1½ & 2-ton.

H

Hahn Motor Truck & Wagon Co., Hamburg, Pa.—1, 1¼ & 2½-ton.

Hal-Fur Motor Truck Co. (S. W.), Cleveland, O.—1 & 2½-ton.

Hall—Lewis-Hall Iron Works, Detroit, Mich.—1, 3½ & 5-ton.

Hamilton Motors Co. See Apex.

Harvey Motor Truck Co., Harvey, Ill.—1½, 2½, 3½ & 5-ton.

Hawkeye Truck Co., Sioux City, Ia.—1½ & 2½-ton.

Hebb Motors Co. See Patriot.

Hendrickson Motor Truck Co., Chicago—2 & 3½-ton.

Hewitt-Ludlow — Ralston Iron Works, San Francisco, Cal.—2, 2½, 3½ & 5-ton trucks and 6-ton tractors.

Highway-Knight—Highway Motors Co., Chicago.—4 & 5-ton.

Higrade Motors Co., Harbor Springs, Mich.—¾ & 1½-ton.

Hoover Wagon Co., York, Pa.—1-ton.

House Cold Tire Setter Co. See Keldon.

Huffman Brothers Motors Co., Elkhart, Ind.—1½-ton.

Hupmobile—Hupp Motor Car Corp., Detroit, Mich.—½-ton.

Hupp Motor Car Co. See Hupmobile.

H & M Motor Truck Co., Baltimore, Md.—2-ton.

(Continued on page 66)

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500—2,000 (Menominee)

INTERNAL-COMBUSTION

Line no.	Brand name and model name or number	Price f. o. b. factory with seat and tires but without body.	Make of engine and model number.	Number of cylinders.	Bore and stroke, and N. A. C. C. horse-power.	Lubrication (Forced-feed, Splash).	Make of governor (None).	Water-circulation (Pump, Thermo-siphon).	Radiator (Cellular, Tubular) and make.	Radiator guard included in price? (Yes or No)	Make of carbureter.	Fuels (Distillate, Gasolene, Kerosene).	Ignition (Battery, Magneto) and make of magneto.	Electric starting and lighting included in price? (Yes or No)	Clutch (Cone, Multiple-disk, Plate) and make.	Transmission (Individual-clutch, Planetary, Sliding-gear) and number of forward speeds.	Make of transmission and model number.	Power take-off included in price? (Yes or No)	Make of universal joints.	Line no.
	500 Pounds:																			
1	Pony	$320	Own	4	2¾x4-12.1			T	C, Own		Stromberg		Atwater-K			F, 3				1
	1,000 Pounds:																			
2	Belmont, A	1,150	G B & S-A	4	3¾x4½-22.5	S	Pierce	T	C, Modine	N	Zenith	G	B	Y	P, G B & S	S, 3	Grant-Lees, K	N	Sterling	2
3	Corliss, A	800		4	3¾x4½-15.6			T			Schebler		M, Splitdorf		M					3
4	Croce, 17	825	Wisconsin	4	3¾x5-16.9						Zenith		M, Bosch		M, Brown-L	S, 3	Brown-Lipe			4
5	Dodge	935	Own	4	3¾x4½-24.2	FS		P	T		Stewart		B, Northeast		M	S, 3				5
6	Duryea, C	675			12.0	S	N				Kingston		M, Bosch							6
7	Seneca, M		Le Roi, C	4	3¾x4½-15.9	FS		T	C, Kuntz	N	Schebler	G	BM, Bosch	Y	P, Borg & B	S, 3	Warner, B	N	Universal	7
8	Vim, 27	1,095	Own	4	3x4½-14.4	FS	N	T	T, McCord	N	Zenith	G	B	N	C, Own	S, 3	Own	N	Spicer	8
	1,200 Pounds:																			
9	Champion	1,100	Light	4	3¼x4½-16.9	S	N	T	C, Jamestown	N	Carter	G	B	N	P, Borg & B	S, 3		N		9
	1,500 Pounds:																			
10	Atlas	1,260		4	3¾x5-19.6	S		T	C	N		G	B	N	P, Borg & B	S, 3		N		10
11	Bethlehem, K		Own	4	3¾x5-19.6	F	N	T	C, Livingston	N	Zenith	G	M, Bosch	Y	P, Borg & B	S, 3	Detroit, DY	N	Spicer	11
12	Conetsoga, 12	1,850	Continental, N	4	3¾x5-19.6	FS		T	C, Fedders	N	Stromberg	G	M, Simms	Y	M, Fuller	S, 3	Fuller, TU¾	N	Spicer	12
13	Dispatch, G	1,200	Wisconsin	4	3¾x5-22.5	F		T			Rayfield		M, Bosch			4				13
14	Economy, T-LHD	1,250	Own	4	3 11/16x5½-21.1		N	P	C, Own		Zenith		B, Auto-Lite		C, Own	S, 3	Warner		Hartford	14
15	Elmira, C	500	Perkins	4	3¾x4-15.6		N	T	C, Bush		Zenith		Atwater-K		C, Own	S, 2	Own		Own	15
16	Geneva, 1		Beaver	2	5½x5½-22.1		N				Schebler		M, Simms		P, Warner	P, 2				16
17	GMC, 16	1,595	Continental, N	4	3¾x5-22.5	FS	Monarch	P	T, Own	N	Marvel	G	M, Eisemann	N	M, Own	S, 3	Own	N	Own	17
18	International, H	1,750	Own	4	3¾x5½-19.6	FS	Own	P	T, Own	Y	Holley	G	M, Bosch	N	M, Own	S, 3	Own	N	Own	18
19	Kearns, H	1,400	Hers'l-Spil 7000	4	3¾x5-19.6	FS	N	T	C, G & O	N	Zenith	G	B	Y	P, Borg & B	S, 3	Grant Lees, K	N	Peters	19
20	Kissel, General Delivery	1,875	Own	4	3¾x5½-24.0	S	Pierce	P	T, Sparks-W	N	Stromberg	G	M, Eisemann	N	M, Warner	S, 3	Warner, T38	N	Spicer	20
21	Old Hickory, M	995	Lycoming	4	3¾x5-16.9		N	T	C, Candler				Connecticut	Y	C, Lycoming	S, 3	Grant-Lees		Thermoid	21
22	Oldsmobile, Ecomony	1,250	Own	4	3 11/16x5½-21.7	F	N	P	C, Own	N	Zenith	G	B	Y	C	S, 3	Warner	N	Hartford	22
23	Patriot, Revere	1,785	Continental	4	3¾x5-22.5	S	N	T	C, B & W	N	Stromberg	G	B	Y	P, Borg & B	S, 3	Covert, MA	N	Thermoid	23
24	Rainier, R11	1,850	Continental N	4	3¾x5-19.6	FS	Monarch	T	C, Harrison	N	Zenith	G	M, Simms	N	M, Brown-L	S, 3	Brown-L, 25	Y	Hartford	24
25	Reo, F		Own	4	4¼x4½-27.2	FS	N	P	T, Own	N	Johnson	G	B	Y	M, Own	S, 3	Own	N	Own	25
26	Stewart, 11	1,350	Le Roi, 2C	4	3¾x4½-15.6	FS	N	T	T, Bush	N	Zenith	G	M, Eisemann	Y	P, Borg & B	S, 3	Durston 02500B	N	Hartford	26
27	Texan	1,200	G B & S	4	4¼x~28.9	F					Carter		M, Delco		M, G B & S	S, 3	Grant-Lees			27
28	Triangle, AA	1,600	Herschell-Spil, 4	4	3¾x5-16.9	S	N	T	T, Perfex	N	Stromberg	G	M, Eisemann	Y	M, Fuller	S, 3	Fuller, TU¾	N	Detroit	28
29	Watson, 21		Waukesha, BUX	4	3¾x5½-22.5	S	Waukesha	P	C, G & O	N	Johnson	G	B	Y	M, Brown-L	S, 3	Brown-L, 35	N	M & E	29
30	White, 15	2,400	Own	4	3¾x5½-22.5	FS	N	P	C	N	Own	G	M	N	P, Own	S, 4	Own	N	Own	30
	2,000 Pounds:																			
31	Acason, R	2,400	Waukesha, BUX	4	3¾x5½-22.5	F	Waukesha	P	C, National	Y	Schebler	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, LTU	N	Blood	31
32	Acme, B	2,175	Continental, N	4	3¾x5-22.5	FS	Duplex	T	C, G and O	N	Rayfield	G	M Eisemann	N	P, Borg & B	I, 3	Cotta, BUC	N	Blood	32
33	All-American	1,295	Herschell-Spil	4	3¾x5-16.9		Pharo	T	C, Standard		Zenith		M Simms		P, Detlaff	I, 3	Cotta		Universal	33
34	Apex, C	1,395	Buda, RU	4	3¾x5½-19.6	FS	N	T	C, Candler	N	Stromberg	G	B, Auto-Lite	N	M, Fuller	S, 3	Fuller, GU¾	N	Detroit	34
35	Atco, IG10	1,875	Buda, WU	4	3¾x5½-22.5	F	N	T	T, Chicago	Y	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, LTU4	Y	Hartford	35
36	Belmont, B	1,950	G B & S, AA	4	3¾x5-22.5	S	Pierce	P	T, Chicago	Y	Zenith	G	M, Eisemann	N	P, G B & S	S, 3	Grant-Lees, 515	N	Sterling	36
37	Bessemer, G	1,825	Continental, N	4	3¾x5-19.6	S	N	T	C, Ideal	N	Zenith	G	M, Bosch	N	M, Fuller	S, 3	Fuller, TU¾	N	Arvac	37
38	Briscoe, T34	1,485	Own	4	3¾x5-18.2		N	T	T, Perfex		Buick		Connecticut	Y	C, Own	S, 3	Own		Universal	38
39	Cameron, D	2,400	Own	6	3x4½-21.6	FS	N			N	Zenith		B	Y	P, Borg & B	S, 3	Own	N	Thermoid	39
40	Chicago, C1	2,200	Hercules, CU2	4	3¾x5½-22.5	F	Duplex	P	T, Own	N	Zenith	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 30	N	Peters	40
41	Clydesdale, 32X	2,185	Continental, N	4	3¾x5-22.5	S	Own	T	T, Own	Y	Zenith	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 30	N	Spicer	41
42	Collier, 18		Continental	4	3¾x5-19.6		Monarch	P	T, Long		Zenith		M, Eisemann		M	S, 3	Fuller			42
43	Columbia, F	1,750	Continental, N	4	3¾x5-22.5	S	Pierce	P	T, Long	N	Stromberg	G	M, Bosch	N	P, Detlaff	S, 3	Covert, B	N	Spicer	43
44	Commerce, E	1,825	Continental, N	4	3¾x5-22.5	S	N	T	T, Long	N	Zenith	G	M, Eisemann	N	C, Detroit	S, 3	Detroit, C	N	Spicer	44
45	Conestoga, 20	2,100	Continental, N	4	3¾x5-19.6	FS		T	T, E & M	N	Stromberg	G	M, Simms	N	M, Fuller	S, 3	Fuller, TU¾	N	Sterling	45
46	Corbitt, E	2,200	Continental, N	4	3¾x5-22.5	FS	Duplex	T	T, McCord	N	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller	N	Hartford	46
47	Dart, H	2,100	Buda, WU	4	3¾x5½-22.5	F	Pierce	T	C, Own	N	Zenith	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU	Y	Spicer	47
48	Day-Elder, A	1,775	Continental	4	3¾x5-19.6		N	T	T, Bush		Zenith		M, Berling		M, Covert	S, 3	Covert		Hartford	48
49	Denby, 12	1,950	Continental, N	4	3¾x5-19.6	F	Monarch	T	T, Long	Y	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU¾	N	Universal	49
50	Diehl, A	1,575	Continental, N	4	3¾x5-19.6	FS	N	T	C, Standard	N	Zenith	G	M, Simms	N	P, Borg & B	S, 3	Durston, 02800		Hartford	50
51	Famous, B10	1,690	Continental	4	3¾x5-19.6		Monarch	T	T, Chicago		Stromberg		M, Eisemann		M, Fuller	S, 3	Fuller		Sterling	51
52	Federal, SD	2,400	Continental, J-4	4	3¾x5-22.5	F	Pharo	P	T, McCord	Y	Zenith	G	M, Eisemann	N	P, Borg & B	S, 3	Own	N	Peters	52
53	Ford, T	550	Own	4	3¾x4-22.5	FS	N	T	T, Own	N	Kingston	G	M, Own	N	M, Own	P, 2	Own	N	Own	53
54	Fulton			4	3¾x5-19.6			T						Y	P, Borg & B	3				54
55	Gabriel, C	2,000	Buda	4	4¼x5½-28.9		N	P	C, G & O		Rayfield		M, Bosch		P, Borg & B	S, 3	Brown-Lipe		Spicer	55
56	Gary, F	1,900	Buda, WU	4	3¾x5-22.5	F	Pierce	P	T, Chicago	Y	Master	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU¾	N	Blood	56
57	Giant, 15	1,950	Continental, N	4	3¾x5-22.5	FS	N	T	C, Ideal	N	Schebler	GK	M, Eisemann	N	M, Brown-L	S, 3	Brown-L, 30	N	Spicer	57
58	GMC, 16	†1,595	Continental, N	4	3¾x5-22.5	FS	Monarch	P	T, Own	N	Marvel	G	M, Eisemann	N	M, Own	S, 3	Own	N	Own	58
59	Hahn, C	1,375	Continental, N	4	3¾x5-19.6	FS			T, Chicago		Stromberg		M, Eisemann		M, Detroit	S, 3	Detroit			59
60	Hal-Fur, C	2,000	Buda	4	4x5-25.6		Duplex	P	T, G & O		Stromberg		M, Bosch	N	P, Borg & B	S, 4	Brown-Lipe		Peters	60
61	Higrade, A18	2,100	Continental, N	4	3¾x5-19.6	FS	Simplex		C, Perfex		Zenith		M, Eisemann		M, Fuller	S, 3	Fuller			61
62	Hoover, 15B	1,435	Continental, N	4	3¾x5-19.6	FS		T	C, Candler		Schebler		M, Splitdorf		M, Fuller	S, 3	Fuller			62
63	Independent (Ohio), F	1,685	Continental	4	3¾x5-19.6		Monarch	T	T, National		Zenith		M, Eisemann		M, Fuller	S, 3	Fuller		Sterling	63
64	International, F	1,950	Own	4	3¾x5½-19.6	FS	Own	P	T, Own	Y	Holley	G	M, Bosch	N	M, Own	S, 3	Own	N	Own	64
65	Jones, 31A	1,395	Continental, N	4	3¾x5-19.6	F	Pierce	P	C, Fedders	N	Stromberg	G	M, Eisemann	N	P, Borg & B	S, 3	Grant-Lees, 515	N	Arvac	65
66	Kleiber, AA	2,400	Continental, C4	4	3¾x5½-22.5	S	Pierce	P	C, Perfex	N	Stromberg	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 35	N	Spicer	66
67	Maccar, S	2,200	Continental, N	4	3¾x5-22.5	F	Mueller	P	T, Own	N	Stromberg	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 30	N	Spicer	67
68	Menominee, Hurryton		Continental, N	4	3¾x5-22.5	S	Monarch	T	C, G & O	N	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU1	N	Spicer	68

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TRUCK SPECIFICATIONS

500—2,000 (Menominee)

Line no.	Final drive (Bevel, Chain, Internal-gear, Spur-and-bevel, Worm) and make of rear axle and model number.	Hotchkiss drive? (Yes or No)	Differential (Bevel, Spur, Worm) and make.	Number and location of driving-wheels (Front, Rear).	Clearance under front and rear axles.	Service and emergency brakes (Contracting, Expanding).	Frame material (Pressed-steel, Rolled-steel) and make.	Front and rear springs (Cantaliver; 1-2, 3-4, or Full elliptic; Transverse).	Make of springs.	Leaves in front and rear springs.	Length and width of front and rear springs.	Driver's position (Left, Right).	Make of steering gear.	Turning-circle diameter (feet and inches).	Wheels (Iron, Steel, Wood) and make.	Wheel-base (standard).	Front and rear tire sizes (dual, pneumatic).	Weight of chassis (pounds). Perc. of weight on rear axle when empty & when loaded.	Line no.
1	C, Own			2, R		E, R, Own	½, ½	Tuthill			L	Own		W, Prudden	90	28x3p-28x3p			1
2	B, Flint	Y	B	2, R	9½, 9½	C, E P	½, ½	Mather	7, 8	36¾x1¾-50x2½	L	Lavine	36, 0	W, E & O	113	31x4p-31x4p	2,200	45, 75	2
3	B			2, R		E, E P	½, ½							W	100	31x4-31x4			3
4	B, Timken			2, R		C, E P	½, ½								108	32x4-32x4			4
5	B			2, R				Detroit						W	114	33x4p-33x4p			5
6				2, R		E, P	C, T							W	86	36x3½p-36x3½p			6
7	B, Peru, 3050		B	2, R	9½, 8½	E, C P	½, C		6, 9	36x1¾-51x2	L	Ditweiler		W	108	30x3½p-30x3½p			7
8	W, Sheldon, W500	Y	W	2, R	11, 10½	E, E P	½, ½	Shelden	8, 7	38x2-50x2	L	Jacox	30, 10	W, Hoopes	108	31x4p-31x4p	2,120	40, 70	8
9	B	Y	B	2, R	10, 10	C, E P	½, ½		7, 8	36x2-50x2	L			W	114	32x4p-32x4p	1,900	60, 70	9
10	B	Y		2, R		C, E P	½, ½		8, 10	36x2-46x2	L	C. A. S.		W	118	32x4p-32x4p			10
11	I, Std Pts, 3070	Y	B	2, R	10, 12	C, E P, Detroit	½, ½	Mather	7, 9	36x2-50x2½	L	Ross	48, 0	W, Wayne	125	34x4½p-35x5p	2,660	—, 80	11
12	I, Torbensen, OX2	Y	B	2, R	9¾, 10½	C, E P, Savage	½, ½	Iron City	7, 9	36x2-48x2½	L	C.A.S.	44, 0	W, E & O	124	32x4½p-32x4½p	2,800	50, 60	12
13	I			2, R			½, ½	Tuthill						W	120	34x4p-34x4p			13
14	I, Torbensen			2, R		C, E P	½, ½	Spring Perch			L	Jacox		W, Auto	128	35x5p-35x5p			14
15	B, Own			2, R		E, E R, Own	½, ½	Tuthill			L	Own			104	28x3p-28x3p			15
16	C, Sheldon			2, R				Sheldon						W	96	34x2-36x2½			16
17	B, Own	N	B	2, R	10¾, 8¾	E, E P, Smith	½, ½	Detroit	8, 11	38x2½-54x2½	L	Jacox	46, 0	W	132	35x5p-35x5p	2,760	50, 67	17
18	I, Own		B	2, R	10½, 11½	E, E P	½, ½		8, 10	41x2½-54x2½	L	Ross		W	115	36x3-36x3½	2,900	50, 64	18
19	I, Torbensen, OX2L	Y	S	2, R	12, 13	E, C P	½, ½	Mather	6, 9	36x2-50x2	L	Lavine		W, E & O	118	32x4½p-32x4½p	2,200	65, 80	19
20	W, Own	Y	B	2, R	9¾, 10	E, E P, Smith	½, ½	Mather	8, 10	36x2-50x2¼	L	Jacox	50, 0	W, Prudden	135	34x4½p-34x4½p	2,950	52, 68	20
21	B, Salisbury			2, R		C, E R, Own	½, ½	Spring Perch			L	C.A.S.		W Salisbury	112	33x4p-33x4p			21
22	I, Torbensen, OX2	Y	W	2, R	10¾, 12	C, E P, Smith	½, ½		7, 10	37x2-50x2½	L	Jacox	46, 0	W	128	35x5p-35x5p	2,580	55, 75	22
23	W, Empire, B	Y	B	2, R	13¼, 12	E, E P, Detroit	½, ½	Cooper	7, 12	38x2½-50x2½	L	C.A.S.	43, 4	W, Bimel	128	35x5p-35x5p	2,800	42, 58	23
24	W, Timken 6352	Y	B	2, R	10, 10½	E, E P, Parish	½, ½	Perfection	8, 9	38x2-50x2½	L	Lavine		W, Schwarz	125	34x4½p-34x4½p	2,400	75, 75	24
25	B, Own	N	B	2, R	11¾, 9¾	C, E P, Own	½, ½	Penn		38x2-40x2½	L	Own	44, 0	W	128	34x4½p-34x4½p	2,615	43½, 62½	25
26	I, Clark, AS	Y	B	2, R	10, 10	C, C P, Hydraulic	½, ½	Detroit	6, 9	37⅛x2-48¾x2½	L	C.A.S.	42, 0	W, Wayne	110	32x4p-32x4p	2,190	53, 66½	26
27	B, Salisbury			2, R		E, E	½, ½							W	115	33x4p-33x4p			27
28	I, Clark, AS	Y	B	2, R		C, C R, Mason	½, ½	Detroit	7, 10	42x2-54x2½	L	Gemmer		W, Hayes	115	35x5p-35x5p	2,600	60, 80	28
29	W, Empire, B	Y	B	2, R	10½, 11	E, E P, Parish	½, ½	Sheldon	8, 8	40x2½-50x2½	L	Lavine		W, Hoopes	128	34x4½p-34x4½p			29
30	B, Own	N	B	2, R	9¼, 9	C, E P	½, ½				L	Own	50, 4	W	133½	34x4½p-34x4½p	2,960	54, 70	30
31	W, Timken, 6352	Y	B	2, R	11, 11	E, E P, Savage	½, ½	Iron City	8, 11	40x2½-50x2½	L	Ross		W, Bimel	142	36x3½-36x5	3,650	—, 73	31
32	W, Timken, 6352	Y	B	2, R	9, 9¼	E, E P	½, ½	Detroit	7, 11	38x2½-52x2½	L	Ross	54, 0	W, Bimel	130	34x3½-34x5	3,200	51, 80	32
33	I, Torbensen			2, R		C, E P, Detroit	½, ½	Detroit			L	Ross		W	130	33x4-32x4			33
34	I, Torbensen	Y	B	2, R	10¼, 11¼	C, E R	½, ½	Detroit	8, 11	36x2-52½x2½	L	Lavine		W, Bimel	130	33x4p-32x3½	2,870	—, 66	34
35	I	Y		2, R			½, ½			40x2½-50x2½	L			W	132	34x4½p-36x6p			35
36	I, Clark	N	B	2, R	12, 12	C, E R, Savage	½, ½	Mather	7, 11	40x2½-52½x2½	L	Lavine	44, 0	W, E & O	144	34x4½p-36x5	3,200	50, 75	36
37	I, Torbensen, A	Y	B	2, R	11, 11¾	C, E P	½, ½	Perfection	8, 10	39x2½-52x2½	L	Ross	54, 0	W, Schwarz	124	34x3-34x4	2,910	47, 60	37
38	I, Russel			2, R		C, E P, Parish	½, ½	Alloy			L	Lavine		W, Hayes	121	33x4-34x3½			38
39	I, Torbensen	Y	S	2, R		C, E P	½, ½				L			S	136	35x6p-35x6p			39
40	W, Timken, 6460	Y	B	2, R	10½, 11	E, E R, Own	½, ½	Mather	8, 9	40x2½-54x3	L	Gemmer		W, Standard	132	36x3-36x4	3,800	60, 75	40
41	W, Std Pts, 602	N	B	2, R	11, 10	E, E P, Parish & B	½, ½	Perfection	9, 7	36x2½-52x3	L	Ross		W, Bimel	144	34x3½-34x5	3,500	51, 62	41
42	W			2, R		E, E P	½, ½								140	34x4-34x5			42
43	I, Russel, PI300	Y	B	2, R		C, E R, Own	½, ½	Perfection	8, 10	38x2½-48x3	L	Own		W, St. Mary	120	34x3½-34x4	3,300		43
44	I, Torbensen, A	Y	B	2, R	10, 11½	C, E P, Detroit	½, ½	Detroit	8, 10	36x2½-50x3	L	Jacox	46, 0	W, Bimel	126	34x3-34x5	2,900		44
45	W, Wis., 800D	Y	W	2, R	10½, 9	E, E R, Own	½, ½	Iron City	8, 10	36x2½-48x2½	L	Ross	50, 0	W, E & O	128	34x3½-34x5	3,400	50, 65	45
46	W, Sheldon	Y	W	2, R		E, E R, Own	½, ½	Mather	8, 10	38x2½-50x2½	L	Lavine		W, Bimel	130	34x3½-34x4		70, 70	46
47	W, Own	Y	B	2, R	10½, 10½	E, E P, Savage	½, ½	Perfection	7, 11	37x2-54x2½	L	Ross	44, 0	W, Prudden	130	34x3½-34x5	3,200	50, 80	47
48	W, Wisconsin			2, R		E, E P, Savage	½, ½				L	Ross		W, Jones	128	34x3-34x4			48
49	I, Russel, P	Y	B	2, R	10, 12½	C, E P, Detroit	½, ½	Detroit	8, 10	43½x2½-48x2½	L	Ross	54, 0	W, Hayes	124	35x5p-36x6p	2,770	51, 73	49
50	I, Torbensen, OX2L	Y	W	2, R	10, 12	C, C	½, ½	Rowland	8, 12	34½x2½-48x2½	L	Jacox	18, 0	W, Schwarz	115	34x4½p-35x5p	2,400	—, 90	50
51	I, Clark			2, R		C, C P, Savage	½, ½	Sheldon			L	Ross		W, Bimel	120	36x3½-36x4			51
52	W, Timken, 6352	N	B	2, R	13, 12	E, E P	½, ½	Mather	7, 8	40x2½-52x2½	L	Gemmer	46, 9	S, Detroit	132	35x5p-36x6p	3,600	55, 70	52
53	W, Own	N	W	2, R	10¾, 8½	C, E P, Parish & B	½t, ½t	Own	7, 9	31⅝x1½-16½x3	L	Own	46, 0	W	124	30x3p-32x3½	1,465		53
54	I			2, R		C, C P								W					54
55	W, Timken			2, R		E, E P, Parish	½, ½	Merrill			L	Gemmer		W, Standard	136	35x5p-35x5p			55
56	W, Timken, 6352	Y	W	2, R	12¼, 11½	E, E P	½, ½	Tuthill	8, 11	40x2½-52x2½	L	Lavine	42, 0	W, Prudden	130	36x3½-36x4	3,200	50, 20	56
57	W, Sheldon, W1500	Y	B	2, R	13, 9¾	E, E P, Hydraulic	½, ½	Mather	6, 9	38x2-48x2½	R	Jacox		W, Wayne	130	34x3½-34x5	2,950	50, 68	57
58	B, Own	N	B	2, R	10¾, 8¼	E, E P	½, ½	Detroit	8, 11	38x2½-54x2½	L	Jacox	46, 0	W	132	35x5p-35x5p	2,760	50, 67	58
59	I, Torbensen			2, R		P, Parish	½, ½	Delaney				Lavine		W	127	34x3-34x4			59
60	W, Timken			2, R		E, E P, Parish & B	½, ½	Spring Perch			L	Gemmer		W, Standard	136	35x5p-35x5p			60
61	W, Sheldon			2, R		E, E P, Own	½, ½	Perfection				Lavine		W, Prudden	115	35x5-35x5			61
62	W, Sheldon			2, R		E, E P, Detroit	½, ½	Sheldon				Lavine		W	120	32x4-33x4½			62
63	W, Chicago			2, R		E, E P, Parish & B	½, ½	Iron City			L			W, Wayne	128	34x3½-34x4			63
64	I, Own		B	2, R	10¼, 11½	E, E P	½, ½		10, 12	40¾x2¼-54x2½	L	Ross		W	128	36x3½-36x4	3,000	50, 64	64
65	I, Russel, O	Y	S	2, R	11¼, 11½	C, E P, Hydraulic	½, ½	Champion	9, 11	37x2½-51½x2½	L	C.A.S.	40, 0	W, Prudden	130	34x3½-34x4	3,400	20, 80	65
66	W, Timken, 6460	Y	W	2, R	9, 9	E, E R	½, ½	Betts	7, 11	44x2½-52x3	R	Ross		W, W't'rh'se	130	34x3½-34x5	4,300	50, 75	66
67	W	N	B	2, R		E, E P	½, ½	Merrill	7, 10	40x2-52x2½	L	Ross		W, Schwarz	135	34x3½-34x4	3,600	—, 70	67
68	W, Timken, 6460	N	B	2, R		E, E R	½, ½	Tuthill	9, 12	39x2½-50x2½	L	Ross		W, Standard	130	34x3½-34x4	3,600		68

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500—2,000 (Menominee) INTERNAL-COMBUSTION

Line no.	Brand name and model name or number	Price f. o. b. factory with seat and tires but without body.	Make of engine and model number.	Number of cylinders.	Bore and stroke, and N. A. C. C. horse-power.	Lubrication (Forced-feed, Splash).	Make of governor (None).	Water-circulation (Pump, Thermo-siphon).	Radiator (Cellular, Tubular) and make.	Radiator guard included in price? (Yes or No)	Make of carbureter.	Fuels (Distillate, Gasolene, Kerosene).	Ignition (Battery, Magneto) and make of magneto.	Electric starting and lighting included in price? (Yes or No)	Clutch (Cone, Multiple-disk, Plate) and make.	Transmission (Individual-clutch, Planetary, Sliding-gear) and number of forward speeds.	Make of transmission and model number.	Power take-off included in price? (Yes or No)	Make of universal joints.	Line no.
	500 Pounds:																			
1	Pony	$320	Own	4	2¾x4-12.1			T	C, Own		Stromberg		Atwater-K			F, 3				1
	1,000 Pounds:																			
2	Belmont, A	1,150	G B & S-A	4	3½x4½-22.5	S	Pierce	T	C, Modine	N	Zenith	G	B	Y	P, G B & S	S, 3	Grant-Lees, K	N	Sterling	2
3	Corliss, A	800		4	3½x4½-15.6			T			Schebler		M, Splitdorf		M					3
4	Croce, 17	825	Wisconsin	4	3½x5-16.9						Zenith		M, Bosch		M, Brown-L	S, 3	Brown-Lipe			4
5	Dodge	935	Own	4	3¾x4½-24.2	FS		P	T		Stewart		B, Northeast		M	S, 3				5
6	Duryea, C	675			12.0	S	N				Kingston		M, Bosch							6
7	Seneca, M		Le Roi, C	4	3¼x4½-15.9	FS		T	C, Kuntz	N	Schebler	G	BM, Bosch	Y	P, Borg & B	S, 3	Warner, B	N	Universal	7
8	Vim, 27	1,095	Own	4	3x4½-14.4	FS	N	T	T, McCord	N	Zenith	G	B	N	C, Own	S, 3	Own	N	Spicer	8
	1,200 Pounds:																			
9	Champion	1,100	Light	4	3¼x4½-16.9	S	N	T	C, Jamestown	N	Carter	G	B	N	P, Borg & B	S, 3		N		9
	1,500 Pounds:																			
10	Atlas	1,260		4	3½x5-19.6	S		T	C	N		G	B	N	P, Borg & B	S, 3		N		10
11	Bethlehem, K		Own	4	3½x5-19.6	F	N	T	C, Livingston	N	Zenith	G	M, Bosch	Y	P, Borg & B	S, 3	Detroit, DY	N	Spicer	11
12	Conetsoga, 12	1,850	Continental, N	4	3½x5-19.6	FS		T	C, Fedders	N	Stromberg	G	M, Simms	Y	M, Fuller	S, 3	Fuller, TU½	N	Spicer	12
13	Dispatch, G	1,200	Wisconsin	4	3½x5-22.5	F		T			Rayfield		M, Bosch			4				13
14	Economy, T-LHD	1,250	Own	4	3 11/16x5½-21.1		N	P	C, Own		Zenith		B, Auto-Lite		C, Own	S, 3	Warner		Hartford	14
15	Elmira, C	500	Perkins	4	3¾x4-15.6		N	T	C, Bush		Zenith		Atwater-K		C, Own	S, 2	Own		Own	15
16	Geneva, 1		Beaver	2	5½x5½-22.1		N				Schebler		M, Simms		P, Warner	P, 2				16
17	GMC, 16	1,595	Continental, N	4	3½x5-22.5	FS	Monarch	P	T, Own	N	Marvel	G	M, Eisemann	N	M, Own	S, 3	Own	N	Own	17
18	International, H	1,750	Own	4	3¾x5½-19.6	FS	Own	P	T, Own	Y	Holley	G	M, Bosch	N	M, Own	S, 3	Own	N	Own	18
19	Kearns, H	1,400	Hers'l-Spil 7000	4	3½x5-19.6	FS	N	T	C, G & O	N	Zenith	G	B	Y	P, Borg & B	S, 3	Grant Lees, K	N	Peters	19
20	Kissel, General Delivery	1,875	Own	4	3½x5½-24.0	S	Pierce	P	T, Sparks-W	N	Stromberg	G	M, Eisemann	N	M, Warner	S, 3	Warner, T38	N	Spicer	20
21	Old Hickory, M	995	Lycoming	4	3¾x5-16.9		N	T	C, Candler				Connecticut	Y	C, Lycoming	S, 3	Grant-Lees		Thermoid	21
22	Oldsmobile, Ecomony	1,250	Own	4	3 11/16x5½-21.7	F	N	P	C, Own	N	Zenith	G	B	Y	C	S, 3	Warner	N	Hartford	22
23	Patriot, Revere	1,785	Continental	4	3½x5-22.5	S	N	T	C, B & W	N	Stromberg	G	B	Y	P, Borg & B	S, 3	Covert, MA	N	Thermoid	23
24	Rainier, R11	1,850	Continental N	4	3¾x5-19.6	FS	Monarch	T	C, Harrison	N	Zenith	G	M, Simms	N	M, Brown-L	S, 3	Brown-L, 25	Y	Hartford	24
25	Reo, F		Own	4	4¼x4½-27.2	FS	N	P	T, Own	N	Johnson	G	B	Y	M, Own	S, 3	Own	N	Own	25
26	Stewart, 11	1,350	Le Roi, 2C	4	3¾x4½-15.6	FS	N	T	T, Bush	N	Zenith	G	M, Eisemann	Y	P, Borg & B	S, 3	Durston 02500B	N	Hartford	26
27	Texan	1,200	G B & S	4	4½x—28.9	F					Carter		M, Delco		M, G B & S	S, 3	Grant-Lees			27
28	Triangle, AA	1,600	Herschell-Spil, 4	4	3½x5-16.9	S	N	T	T, Perfex	N	Stromberg	G	M, Eisemann	Y	M, Fuller	S, 3	Fuller, TU¾	N	Detroit	28
29	Watson, 21		Waukesha, BUX	4	3½x5½-22.5	S	Waukesha	P	C, G & O	N	Johnson	G	B	Y	M, Brown-L	S, 3	Brown-L, 35	N	M & E	29
30	White, 15	2,400	Own	4	3½x5½-22.5	FS	N	P	C	N	Own	G	M	N	P, Own	S, 4	Own	N	Own	30
	2,000 Pounds:																			
31	Acason, R	2,400	Waukesha, BUX	4	3½x5½-22.5	F	Waukesha	P	C, National	Y	Schebler	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, LTU	N	Blood	31
32	Acme, B	2,175	Continental, N	4	3½x5-22.5	FS	Duplex	T	C, G and O	N	Rayfield	G	M, Eisemann	N	P, Borg & B	I, 3	Cotta, BUC	N	Blood	32
33	All-American	1,295	Herschell-Spil	4	3½x5-16.9		Pharo	T	C, Standard		Zenith		M, Simms		P, Detlaff	I, 3	Cotta		Universal	33
34	Apex, C	1,395	Buda, RU	4	3½x5½-19.6	FS	N	T	C, Candler	N	Stromberg	G	B, Auto-Lite	N	M, Fuller	S, 3	Fuller, GU¾	N	Detroit	34
35	Atco, IG10	1,875	Buda, WU	4	3¾x5½-22.5	F	N	T	T, Chicago	Y	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, LTU4	Y	Hartford	35
36	Belmont, B	1,950	G B & S, AA	4	3½x5-22.5	S	Pierce	P	T, Chicago	Y	Zenith	G	M, Eisemann	N	P, G B & S	S, 3	Grant-Lees, 515	N	Sterling	36
37	Bessemer, G	1,825	Continental, N	4	3¾x5-19.6	S	N	T	C, Ideal	N	Zenith	G	M, Bosch	N	M, Fuller	S, 3	Fuller, TU¾	N	Arvac	37
38	Briscoe, T34	1,485	Own	4	3½x5-18.2		N	T	T, Perfex		Buick		Connecticut	Y	C, Own	S, 3	Own		Universal	38
39	Cameron, D	2,400	Own	6	3x4½-21.6	FS	N			N	Zenith		B	Y	P, Borg & B	S, 3	Own	N	Thermoid	39
40	Chicago, C1	2,200	Hercules, CU2	4	3½x5½-22.5	F	Duplex	P	T, Own	N	Zenith	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 30	N	Peters	40
41	Clydesdale, 32X	2,185	Continental, N	4	3½x5-22.5	S	Own	T	T, Own	Y	Zenith	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 30	N	Spicer	41
42	Collier, 18		Continental	4	3¾x5-19.6		Monarch	P	T, Long		Zenith		M, Eisemann		M	S, 3	Fuller			42
43	Columbia, F	1,750	Continental, N	4	3¾x5-22.5	S	Pierce	P	T, Long	N	Stromberg	G	M, Bosch	N	P, Detlaff	S, 3	Covert, B	N	Spicer	43
44	Commerce, E	1,825	Continental, N	4	3½x5-22.5	S	N	T	T, Long	N	Zenith	G	M, Eisemann	N	C, Detroit	S 3	Detroit, C	N	Spicer	44
45	Conestoga, 20	2,100	Continental, N	4	3¾x5-19.6	FS		T	T, E & M	N	Stromberg	G	M, Simms	N	M, Fuller	S, 3	Fuller, TU¾	N	Sterling	45
46	Corbitt, E	2,200	Continental, N	4	3½x5-22.5	FS	Duplex	T	T, McCord	N	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller	N	Hartford	46
47	Dart, H	2,100	Buda, WU	4	3¾x5½-22.5	F	Pierce	T	C, Own	N	Zenith	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU	Y	Spicer	47
48	Day-Elder, A	1,775	Continental	4	3¾x5-19.6		N	T	T, Bush		Zenith		M, Berling		M, Covert	S, 3	Covert		Hartford	48
49	Denby, 12	1,950	Continental, N	4	3¾x5-19.6	F	Monarch	T	T, Long	Y	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU¾	N	Universal	49
50	Diehl, A	1,575	Continental, N	4	3¾x5-19.6	FS	N	T	C, Standard	N	Zenith	G	M, Simms	N	P, Borg & B	S, 3	Durston, 02800		Hartford	50
51	Famous, B10	1,690	Continental	4	3¾x5-19.6		Monarch	T	T, Chicago		Stromberg		M, Eisemann		M, Fuller	S, 3	Fuller		Sterling	51
52	Federal, SD	2,400	Continental, J-4	4	3¾x5-22.5	F	Pharo	P	T, McCord	Y	Zenith	G	M, Eisemann	N	P, Borg & B	S, 3	Own	N	Peters	52
53	Ford, T	550	Own	4	3¾x4-22.5	FS	N	T	T, Own	N	Kingston	G	M, Own	N	M, Own	P, 2	Own	N	Own	53
54	Fulton			4	3¾x5-19.6			T						Y	P, Borg & B	3				54
55	Gabriel, C	2,000	Buda	4	4¼x5½-28.9		N	P	C, G & O		Rayfield		M, Bosch		P, Borg & B	S, 3	Brown-Lipe		Spicer	55
56	Gary, F	1,900	Buda, WU	4	3½x5-22.5	F	Pierce	P	T, Chicago	Y	Master	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU¾	N	Blood	56
57	Giant, 15	1,950	Continental, N	4	3½x5-22.5	FS	N	T	C, Ideal	N	Schebler	GK	M, Eisemann	N	M, Brown-L	S, 3	Brown-L, 30	N	Spicer	57
58	GMC, 16	†1,595	Continental, N	4	3½x5-22.5	FS	Monarch	P	T, Own	N	Marvel	G	M, Eisemann	N	M, Own	S, 3	Own	N	Own	58
59	Hahn, C	1,375	Continental, N	4	3¾x5-19.6	FS			T, Chicago		Stromberg		M, Eisemann		M, Detroit	S, 3	Detroit			59
60	Hal-Fur, C	2,000	Buda	4	4x5-25.6		Duplex	P	T, G & O		Stromberg		M, Bosch	N	P, Borg & B	S, 4	Brown-Lipe		Peters	60
61	Higrade, A18	2,100	Continental, N	4	3½x5-19.6	FS	Simplex		C, Perfex		Zenith		M, Eisemann		M, Fuller	S, 3	Fuller			61
62	Hoover, 15B	1,435	Continental, N	4	3½x5-19.6	FS		T	C, Candler		Schebler		M, Splitdorf		M, Fuller	S, 3	Fuller			62
63	Independent (Ohio), F	1,685	Continental	4	3½x5-19.6		Monarch	T	T, National		Zenith		M, Eisemann		M, Fuller	S, 3	Fuller		Sterling	63
64	International, F	1,950	Own	4	3¾x5½-19.6	FS	Own	P	T, Own	Y	Holley	G	M, Bosch	N	M, Own	S, 3	Own	N	Own	64
65	Jones, 31A	1,395	Continental, N	4	3½x5-19.6	F	Pierce	P	C, Fedders	N	Stromberg	G	M, Eisemann	N	P, Borg & B	S, 3	Grant-Lees, 515	N	Arvac	65
66	Kleiber, AA	2,400	Continental, C4	4	3½x5½-22.5	S	Pierce	P	C, Perfex	N	Stromberg	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L,35	N	Spicer	66
67	Maccar, S	2,200	Continental, N	4	3½x5-22.5	F	Mueller	P	T, Own	N	Stromberg	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L,30	N	Spicer	67
68	Menominee, Hurryton		Continental, N	4	3½x5-22.5	S	Monarch	T	C, G & O	N	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU1	N	Spicer	68

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TRUCK SPECIFICATIONS

500—2,000 (Menominee)

Line no.	Final drive (Bevel, Chain, Internal-gear, Spur-and-bevel, Worm) and make of rear axle and model number.	Hotchkiss drive? (Yes or No)	Differential (Bevel, Spur, Worm) and make.	Number and location of driving-wheels (Front, Rear).	Clearance under front and rear axles.	Service and emergency brakes (Contracting, Expanding).	Frame material (Pressed-steel, Rolled-steel) and make.	Front and rear springs (Cantaliver; 1-2, 3-4, or Full elliptic; Transverse).	Make of springs.	Leaves in front and rear springs.	Length and width of front and rear springs.	Driver's position (Left, Right).	Make of steering gear.	Turning-circle diameter (feet and inches).	Wheels (Iron, Steel, Wood) and make.	Wheel-base (standard).	Front and rear tire sizes (dual, pneumatic).	Weight of chassis (pounds).	Perc. of weight on rear axle when empty & when loaded.	Line no.
1	C, Own			2, R		E,	R, Own	½, ½	Tuthill			L	Own		W, Prudden	90	28x3p-28x3p			1
2	B, Flint	Y	B	2, R	9½, 9½	C, E	P	½, ½	Mather	7, 8	36½x1½-50x2½	L	Lavine	36, 0	W, E & O.	113	31x4p-31x4p	2,200	45, 75	2
3	B			2, R		E, E	P	½, ½							W	100	31x4-31x4			3
4	B, Timken			2, R		C, E	P									108	32x4-32x4			4
5	B			2, R					Detroit						W	114	33x4p-33x4p			5
6				2, R		E,	P	C, T							W	86	36x3½p-36x3½p			6
7	B, Peru, 3050		B	2, R	9½, 8½	E, C	P	½, C		6, 9	36x1½-51x2	L	Ditweiler		W	108	30x3½p-30x3½p			7
8	W, Sheldon, W500	Y	W	2, R	11, 10½	E, E	P	½, ½	Shelden	8, 7	38x2-50x2	L	Jacox	30, 10	W, Hoopes	108	31x4p-31x4p	2,120	40, 70	8
9	B	Y	B	2, R	10, 10	C, E	P	½, ½		7, 8	36x2-50x2	L			W	114	32x4p-32x4p	1,900	60, 70	9
10	B	Y		2, R		C, E	P	½, ½		8, 10	36x2-46x2	L	C. A. S.		W	118	32x4p-32x4p			10
11	I, Std Pts, 3070	Y	B	2, R	10, 12	C, E	P, Detroit	½, ½	Mather	7, 9	36x2-50x2½	L	Ross	48, 0	W, Wayne	125	34x4½p-35x5p	2,660	—, 80	11
12	I, Torbensen, OX2	Y	B	2, R	9¾, 10½	C, E	P, Savage	½, ½	Iron City	7, 9	36x2-48x2½	L	C.A.S.	44, 0	W, E & O.	124	32x4½p-32x4½p	2,800	50, 60	12
13	I			2, R				½, ½	Tuthill						W	120	34x4p-34x4p			13
14	I, Torbensen			2, R		C, E	P	½, ½	Spring Perch			L	Jacox		W, Auto	128	35x5p-35x5p			14
15	B, Own			2, R		E, E	R, Own	½, ½	Tuthill			L	Own			104	28x3p-28x3p			15
16	C, Sheldon			2, R					Sheldon						W	96	34x2-36x2½			16
17	B, Own	N	B	2, R	10¾, 8¾	E, E	P, Smith	½, ½	Detroit	8, 11	38x2¼-54x2½	L	Jacox	46, 0	W	132	35x5p-35x5p	2,760	50, 67	17
18	I, Own		B	2, R	10¼, 11¼	E, E	P	½, ½		8, 10	41x2¼-54x2½	L	Ross		W	115	36x3-36x3½	2,900	50, 64	18
19	I, Torbensen, OX2L	Y	S	2, R	12, 13	E, C	P	½, ½	Mather	6, 9	36x2-50x2	L	Lavine		W, E & O.	118	32x4½p-32x4½p	2,200	65, 80	19
20	W, Own	Y	B	2, R	9¾, 10	E, E	P, Smith	½, ½	Mather	8, 10	36x2-50x2¼	L	Jacox	50, 0	W, Prudden	135	34x4½p-34x4½p	2,950	52, 68	20
21	B, Salisbury			2, R		C, E	R, Own	½, ½	Spring Perch			L	C.A.S.		W Salisbury	112	33x4p-33x4p			21
22	I, Torbensen, OX2	Y	W	2, R	10¾, 12	C, E	P, Smith	½, ½		7, 10	37x2-50x2¼	L	Jacox	46, 0	W	128	35x5p-35x5p	2,580	55, 75	22
23	W, Empire, B	Y	B	2, R	13¼, 12	E, E	P, Detroit	½, ½	Cooper	7, 12	38x2¼-50x2½	L	C.A.S.	43, 4	W, Bimel.	128	35x5p-35x5p	2,800	42, 58	23
24	W, Timken 6352	Y	B	2, R	10, 10½	E, E	P, Parish	½, ½	Perfection	8, 9	38x2-50x2½	L	Lavine		W, Schwarz.	125	34x4½p-34x4½p	2,400	75, 75	24
25	B, Own	N	B	2, R	11¾, 9¾	C, E	P, Own	½, ½	Penn		38x2-40x2½	L	Own	44, 0	W	128	34x4½p-34x4½p	2,615	43½, 62½	25
26	I, Clark, AS	Y	B	2, R	10, 10	C, C	P, Hydraulic	½, ½	Detroit	6, 9	37½x2-48¾x2¼	L	C.A.S.	42, 0	W, Wayne	110	32x4p-32x4p	2,190	53, 66⅔	26
27	B, Salisbury			2, R		E, E		½, ½							W	115	33x4p-33x4p			27
28	I, Clark, AS	Y	B	2, R		C, C	R, Mason	½, ½	Detroit	7, 10	42x2-54x2½	L	Gemmer		W, Hayes	115	35x5p-35x5p	2,600	60, 80	28
29	W, Empire, B	Y	B	2, R	10½, 11	E, E	P, Parish	½, ½	Sheldon	8, 8	40x2½-50x2¼	L	Lavine		W, Hoopes	128	34x4½p-34x4½p			29
30	B, Own	N	B	2, R	9¼, 9	C, E	P	½, ½				L	Own	50, 4	W	133½	34x4½p-34x4½p	2,960	54, 70	30
31	W, Timken, 6352	Y	B	2, R	11, 11	E, E	P, Savage	½, ½	Iron City	8, 11	40x2¼-50x2½	L	Ross		W, Bimel	142	36x3½-36x5	3,650	—, 73	31
32	W, Timken, 6352	Y	B	2, R	9, 9½	E, E	P	½, ½	Detroit	7, 11	38x2¼-52x2½	L	Ross	54, 0	W, Bimel	130	34x3½-34x5	3,200	51, 80	32
33	I, Torbensen			2, R		C, E	P, Detroit	½, ½	Detroit			L	Ross		W	130	33x4-32x4			33
34	I, Torbensen	Y	B	2, R	10¼, 11¼	C, E	R	½, ½	Detroit	8, 11	36x2-52½x2½	L	Lavine		W, Bimel	130	33x4p-32x3½	2,870	—, 66	34
35	I	Y		2, R				½, ½			40x2¼-50x2½	L			W	132	34x4½p-36x6p			35
36	I, Clark	N	B	2, R	12, 12	C, E	R, Savage	½, ½	Mather	7, 11	40x2½-52½x2¼	L	Lavine	44, 0	W, E & O.	144	34x4½p-36x5	3,200	50, 75	36
37	I, Torbensen, A	Y	B	2, R	11, 11¾	C, E	P	½, ½	Perfection	8, 10	39x2¼-52x2½	L	Ross	54, 0	W, Schwarz.	124	34x3-34x4	2,910	47, 60	37
38	I, Russel			2, R		C, E	P, Parish	½, ½	Alloy			L	Lavine		W, Hayes	121	33x4-34x3½			38
39	I, Torbensen	Y	S	2, R		C, E	P	½, ½				L			S	136	35x6p-35x6p			39
40	W, Timken, 6460	Y	B	2, R	10½, 11	E, E	R, Own	½, ½	Mather	8, 9	40x2½-54x3	L	Gemmer		W, Standard	132	36x3-36x4	3,800	60, 75	40
41	W, Std Pts, 602	N	B	2, R	11, 10	E, E	P, Parish & B	½, ½	Perfection	9, 7	36x2¼-52x3	L	Ross		W, Bimel	144	34x3½-34x5	3,500	51, 62	41
42	W			2, R		E, E	P	½, ½								140	34x4-34x5			42
43	I, Russel, PI300	Y	B	2, R		C, E	R, Own	½, ½	Perfection	8, 10	38x2½-48x3	L	Own		W, St. Mary	120	34x3½-34x4	3,300		43
44	I, Torbensen, A	Y	B	2, R	10, 11½	C, E	P, Detroit	½, ½	Detroit	8, 10	36x2¼-50x3	L	Jacox	46, 0	W, Bimel	126	34x3-34x5	2,900		44
45	W, Wis., 800D	Y	W	2, R	10½, 9	E, E	R, Own	½, ½	Iron City	8, 10	36x2¼-48x2½	L	Ross	50, 0	W, E & O.	128	34x3½-34x5	3,400	50, 65	45
46	W, Sheldon	Y	W	2, R		E, E	R, Own	½, ½	Mather	8, 10	38x2½-50x2½	L	Lavine		W, Bimel	130	34x3½-34x4		70, 70	46
47	W, Own	Y	B	2, R	10½, 10½	E, E	P, Savage	½, ½	Perfection	7, 11	37x2-54x2½	L	Ross	44, 0	W, Prudden	130	34x3½-34x5	3,200	50, 80	47
48	W, Wisconsin			2, R		E, E	P, Savage	½, ½				L	Ross		W, Jones	128	34x3-34x4			48
49	I, Russel, P	Y	B	2, R	10, 12½	C, E	P, Detroit	½, ½	Detroit	8, 10	43½x2¼-48x2½	L	Ross	54, 0	W, Hayes	124	35x5p-36x6p	2,770	51, 73	49
50	I, Torbensen, OX2L	Y	W	2, R	10, 12	C, C		½, ½	Rowland	8, 12	34½x2½-48x2½	L	Jacox	18, 0	W, Schwarz.	115	34x4½p-35x5p	2,400	—, 90	50
51	I, Clark			2, R		C, C	P, Savage	½, ½	Sheldon			L	Ross		W, Bimel	120	36x3½-36x4			51
52	W, Timken, 6352	N	B	2, R	13, 12	E, E	P	½, ½	Mather	7, 8	40x2¼-52x2½	L	Gemmer	46, 9	S, Detroit	132	35x5p-36x6p	3,600	55, 70	52
53	W, Own	N	W	2, R	10¾, 8½	C, E	P, Parish & B	½t, ½t	Own	7, 9	31⅝x1½-16½x3	L	Own	46, 0	W	124	30x3p-32x3½	1,465		53
54	I			2, R		C, C	P								W					54
55	W, Timken			2, R		E, E	P, Parish	½, ½	Merrill			L	Gemmer		W, Standard	136	35x5p-35x5p			55
56	W, Timken, 6352	Y	W	2, R	12½, 11½	E, E	P	½, ½	Tuthill	8, 11	40x2¼-52x2½	L	Lavine	42, 0	W, Prudden	130	36x3½-36x4	3,200	50, 20	56
57	W, Sheldon, W1500	Y	B	2, R	13, 9¾	E, E	P, Hydraulic	½, ½	Mather	6, 9	38x2-48x2½	R	Jacox		W, Wayne	130	34x3½-34x5	2,950	50, 68	57
58	B, Own	N	B	2, R	10¾, 8¾	E, E	P	½, ½	Detroit	8, 11	38x2¼-54x2½	L	Jacox	46, 0	W	132	35x5p-35x5p	2,760	50, 67	58
59	I, Torbensen			2, R			P, Parish	½, ½	Delaney				Lavine		W	127	34x3-34x4			59
60	W, Timken			2, R		E, E	P, Parish & B	½, ½	Spring Perch			L	Gemmer		W, Standard	136	35x5p-35x5p			60
61	W, Sheldon			2, R		E, E	P, Own	½, ½	Perfection				Lavine		W, Prudden	115	35x5-35x5			61
62	W, Sheldon			2, R		E, E	P, Detroit	½, ½	Sheldon				Lavine		W	120	32x4-33x4½			62
63	W, Chicago			2, R		E, E	P, Parish & B	½, ½	Iron City			L			W, Wayne	128	34x3½-34x4			63
64	I, Own		B	2, R	10¼, 11½	E, E	P	½, ½		10, 12	40½x2¼-54x2½	L	Ross		W	128	36x3½-36x4	3,000	50, 64	64
65	I, Russel, O	Y	S	2, R	11¼, 11½	C, E	P, Hydraulic	½, ½	Champion	9, 11	37x2¼-51½x2½	L	C.A.S.	40, 0	W, Prudden	130	34x3½-34x4	3,400	20, 80	65
66	W, Timken, 6460	Y	W	2, R	9, 9	E, E	R	½, ½	Betts	7, 11	44x2½-52x3	R	Ross		W, W't'rh'se	130	34x3½-34x5	4,300	50, 75	66
67	W	N	B	2, R		E, E	P	½, ½	Merrill	7, 10	40x2-52x2½	L	Ross		W, Schwarz.	135	34x3½-34x4	3,600	—, 70	67
68	W, Timken, 6460	N	B	2, R		E, E	R	½, ½	Tuthill	9, 12	39x2¼-50x2¼	L	Ross		W, Standard	130	34x3½-34x4	3,600		68

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2,000 (Myers)—3,000 (International) INTERNAL-COMBUSTION

Line no.	Brand name and model name or number	Price f. o. b. factory with seat and tires but without body.	Make of engine and model number.	Number of cylinders.	Bore and stroke, and N. A. C. C. horse-power.	Lubrication (Forced-feed, Splash).	Make of governor (None).	Water-circulation (Pump, Thermo-siphon).	Radiator (Cellular, Tubular) and make.	Radiator guard included in price? (Yes or No)	Make of carbureter.	Fuels (Distillate, Gasolene, Kerosene).	Ignition (Battery, Magneto) and make of magneto.	Electric starting and lighting included in price? (Yes or No)	Clutch (Cone, Multiple-disk, Plate) and make.	Transmission (Individual-clutch, Planetary, Sliding-gear) and number of forward speeds.	Make of transmission and model number.	Power take-off included in price? (Yes or No)	Make of universal joints.	Line no.
	2,000 Pds.—Con.																			
69	Myers, 60	1,545	Lycoming	4	3½x5-19.6	FS	N	T	C, Standard	N	Zenith	G	M, Eisemann	N	M, Mechanics	S, 3	Mechanics	N	Universal	69
70	Napoleon, 9		Victory	4	3½x5-19.6	F	N	T	T, Chicago	Y	Stromberg	G	B	N	M, Fuller	S, 3	Fuller, TU½	N	Universal	70
71	Nash, 2018	17,85	Own	4	3½x5½-22.5	FS	Simplex	T	T, Long	N	Stromberg	G	M, Eisemann	Y	P, Borg & B	S, 3	Detroit, C	N	Own	71
72	National, FA		Waukesha, BUX	4	3½x5½-22.5	S	Waukesha	P	C, McKinnon	N	Zenith	G	M, Eisemann	N	M, Brown-L	S, 3	Brown-L, 30	N	Spicer	72
73	Noble, A20		Buda	4	3½x5½-22.5		Pierce	P	T, Chicago		Stromberg		M, Eisemann		M, Fuller	S, 3	Fuller		M & E	73
74	Ogden, A1		Continental, N	4	3½x5-22.5	S	Pierce	T	T, Chicago	Y	Rayfield	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 30	N	Acme	74
75	Palmer	1,585	Continental, N	4	3½x5-22.5	FS	Pierce	P	C, Fedders		Stromberg		M, Bosch		M, Fuller	S, 3	Fuller			75
76	Rainier, R9	2,050	Continental, N	4	3½x5-19.6	FS	Monarch	T	C, Harrison	N	Zenith	G	M, Simms	N	M, Brown-L	S, 3	Brown-L, 25	Y	Hartford	76
77	Republic, 10		Continental, N	4	3½x5-22.5	FS	Ruggles	T	C, Own	N	Stromberg	G	M	N	M, Fuller	S, 3	Fuller, TU½	N	Hartford	77
78	Royal	2,400	Wisconsin	4	3½x5-16.9		Monarch	P	T, Kells		Stromberg		M, Bosch		P, Borg & B	I, 3	Own			78
79	Sandow, G	1,895	Continental, N	4	3½x5-19.5	S	N	T	T, Chicago	Y	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU½	N	Spicer	79
80	Service, 220	2,415	Buda, RU	4	3½x5½-19.6	F	N	T	T, Long	N	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU	N	Arvac	80
81	Signal, F	2,750	Continental, C4	4	4½x5½-27.2	FS	Pierce	P	T, McCord	Y	Stromberg	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 35	N	Spicer	81
82	Southern, 10	1,875	Buda, RU	4	3½x5½-19.6	FS	Pierce	T	T, Standard	N	Zenith		M, Bosch	N	P, Borg & B	S, 3	Fuller	N	Spicer	82
83	Standard, 56		Continental, N	4	3½x5-22.5	FS	Monarch	P	T, Long	N	Stromberg	G	M, Eisemann	N	M, Brown-L	S, 3	Brown-L, 30	N	Spicer	83
84	Stewart, 12	1,655	Continental, N	4	3½x5-19.6	FS	N	T	T, Bush	N	Zenith	G	M, Eisemann	N	P, Borg & B	S, 3	Durston, 02800	N	Hartford	84
85	Superior, D	1,600	Continental, N	4	3½x5-22.5	F	Pierce	T	C, Ideal	Y	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU½	Y	Arvac	85
86	Transport 20	1,850	Continental, N	4	3½x5-22.5	FS	Simplex	T	C, Spirex	Y	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU½	N	Hartford	86
87	Traylor, B	2,075	Buda, WU	4	3½x5½-22.5	F	Pierce	P	T, G & O	N	Zenith	G	M, Dixie	N	M, Covert	S, 3	Covert	N		87
88	Vim, 22	2,195	Hercules	4	3½x5½-22.5	F	N	P	T, McCord	N	Zenith	G	M, Dixie	N	M, Brown-L	S, 3	Brown-L, 30	N	Spicer	88
89	Wilcox, A		Buda, QU	4	3½x5½-22.5	S	Pierce	P	T, Long	N	Stromberg	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 30	N		89
90	Witt-Will, N	2,000	Continental	4	3½x5-22.5		Pierce	P	C, Bremer		Zenith		M, Eisemann	N	M, Brown-L	S, 3	Brown-Lipe		Spicer	90
	2,500 Pounds:																			
91	Garford, 25	2,090		4	3½x5½-22.5	S	Monarch	P	T, Own	N	Stromberg	G	M, Splitdorf	N	M	S, 3		N		91
92	Hahn, C	1,950	Continental C4	4	4½x5½-27.2	FS	Pierce	P	T, Chicago		Stromberg		M, Bosch		M, Brown-L	S, 3	Brown-L			92
93	Indiana, 12	2,150	Waukesha, BUX	4	3½x5½-22.5	F	Waukesha	P	T, Long	Y	Stromberg	G	M, Eisemann	N	P, Borg & B	S, 3	Covert, G1	N	Acme	93
94	Koehler, C	1,885	Herr'l-Spil. 7000	4	3½x5-19.6	F	Simplex	T	C, Gordon	Y	Zenith	G	M, Eisemann	N	P, Mechanics	S, 3	Mechanics, LU	N	Kinsler-B	94
95	Old Hickory, W	2,175	Continental, N	4	3½x5-22.5	FS	Pierce	T	T, Long		Stromberg		M, Eisemann		P, Borg & B	S, 3	Grant-Lees, 515			95
96	Rock Falls, 9	3,500	Buda	6	3½x5½-29.5		N	P	C, Sparks-W		Rayfield		M, Bosch	Y	P, Borg & B	S, 3	Grant-Lees		Spicer	96
	3,000 Pounds:																			
97	Asson, RB	2,650	Waukesha, BUX	4	3½x5½-22.5	F	Waukesha	P	C, National	Y	Schebler	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, LTU	N	Blood	97
98	Ace, C		Buda, WU	4	3½x5½-22.5	F	Pierce	P	C, Modine	Y	Schebler	G	BM, Eis'm'nn	Y	M, M & E	I, 3	Cotta, AA	N	Spicer	98
99	Acme, F	2,375	Continental, N	4	3½x5-22.5	FS	Duplex	T	T, G & O	N	Rayfield	G	M, Eisemann	N	P, Borg & B	I, 3	Cotta, BUC	N	Blood	99
100	Apex, D	1,595	Buda, RU	4	3½x5½-19.6	FS	N	T	C, Candler	N	Stromberg	G	B, Auto-Lite	N	M, Fuller	S, 3	Fuller, GU½	N	Detroit	100
100a	Available, H1½	2,550	Hercules, CU3	4	4x5-25.6	FS	Pierce	P	T, Chicago	Y	Stromberg	G	M, Bosch	N	M, Detlaff	I, 4	Cotta, A		Sp. & Th	100a
101	Beck, A	1,750	Continental	4	3½x5-22.5	S	Pierce	T	C, Ideal	Y	Stromberg	G	M, Bosch	N	M, Fuller	S, 3	Fuller, TU½	Y	Blood	101
102	Bell		Buda, RU	4	3½x5½-19.6	F	Duplex		T, Chicago		Stromberg		M, Eisemann		P, Borg & B	S, 3				102
103	Bessemer, H2	2,445	Continental, N	4	3½x5-22.5	S	Pierce	T	C, Standard	N	Zenith	G	M, Bosch	N	P, Borg & B	S, 3	Brown-L, 35	N	Arvac	103
104	Bethlehem, DG		Owa	4	4x5½-25.6	F	Pierce	T	C, Fedders	N	Stromberg	G	M, Bosch	Y	P, Borg & B	S, 3	Detroit, DX	N	Universal	104
105	Brockway, 82	2,100	Continental, N	4	3½x5-22.5	S	N	T	T, Bush	N	Stromberg	G	M, Eisemann	N	M, Brown-L	S, 3	Brown-L, 30	N	Spicer	105
106	Chicago, C1½	2,750	Hercules, CU2	4	3½x5½-22.5	F	N	P	T, Own	N	Zenith	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 30	N	Peters	106
107	Clydesdale, 42	2,445	Continental, N	4	3½x5-22.5	S	Own	T	T, Own	Y	Zenith	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 30	N	Spicer	107
108	Collier, 19		Continental	4	3½x5-22.5		Monarch	P			Zenith		M, Eisemann		M, Fuller	S, 3	Fuller			108
109	Comet, 1-T-2	1,950	Lycoming	4	3½x5-19.6	S	N	T	C, Standard	Y	Carter	G	B, Dynoto	Y	P, Borg & B	S, 3	Muncie, T25	Y	Arvac	109
110	Commerce, EP	2,065	Continental, N	4	3½x5-22.5	S	N	T	T, Long	N	Zenith	G	M, Eisemann	N	C, Detroit	S, 3	Detroit, C	N	Spicer	110
111	Concord, A	2,350	Buda	4	3½x5½-22.5		Monarch	P	T, Bush		Zenith		M, Eisemann		M, Brown-L	S, 3	Brown-Lipe		Spicer	111
112	Corbitt, D	2,600	Continental, N	4	3½x5-22.5	FS	Duplex	T	T, McCord	N	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller	N	Hartford	112
113	Dart, S	2,250	Buda, WU	4	3½x5½-22.5	F	Pierce	T	C, Own	N	Zenith	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU	Y	Spicer	113
114	Day-Elder, B	2,075	Continental	4	3½x5-22.5		Monarch	T	T, Bush		Zenith		M, Berling		M, Covert	S, 3	Covert		Spicer	114
115	Dearborn, F	1,980	Continental, N	4	3½x5-19.6	F	N	T	T, Chicago	Y	Stromberg	G	M, Bosch	N	M, Fuller	S, 3	Fuller, TU½	N	Hartford	115
116	Defiance, D		Continental	4	3½x5-22.5		N	P	C, Perfex		Stromberg			Y	P, Borg & B	S, 3	Grant-Lees			116
117	Dependable, C	2,150	Buda, CTU	4	3½x5½-22.5	F	Pierce	P	T, Long	N	Zenith	G	M, Dixie	N	M, Fuller	S, 3	Fuller, LTU	N	Acme	117
118	Diamond T, T	2,675		4	3½x5½-22.5	F		P	T, G & O	N	Stromberg	G	M, Bosch	N	M	S, 3		N	Sa'd & Sp	118
118a	Douglas, G	1,975	Weidely	4	3½x5-22.5	F		P	Own		Schebler		M, Eisemann		P, Borg & B	S, 3	Grant-Lees		Arvac	118a
119	Duplex, A	2,575	Hinkley, HAA	4	4x5½-25.6	FS	N	P	T, Modine	N	Stromberg	G	B	Y	M, Covert	S, 3	Covert, MUC	Y	Peters	119
120	Erie			4	4½x5½-27.2		Pierce	T			Stromberg		M, Bosch		M	4				120
121	Fageol		Lycoming, K	4	3½x5-19.6	S	N	P	C, Modine	N	Zenith	DG	M, Dixie	N	P, Borg & B	S, 5	Own	Y	Detroit	121
122	Federal, TE	2,600	Continental, C4	4	4½x5½-27.2	FS	Pharo	P	T, McCord	Y	Zenith	G	M, Eisemann	N	P, Borg & B	S, 4	Detroit, TUE	N	Spicer	122
123	Forschler, AX	2,375	Continental	4	3½x5-19.6		Duplex	P	T, Own		Zenith		M, Bosch		M, Fuller	S, 3	Fuller		Own	123
124	Gary, GT	2,250	Buda, TU	4	4x5½-25.6	F	McCanna	P	T, Chicago	Y	Master	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU3	N	Blood	124
125	Giant, 15	2,425	Continental, N	4	3½x5-22.5	FS	N	T	C, Ideal	N	Schebler	G, K	M, Eisemann	N	M, Brown-L	S, 3	Brown-L, 30	N	Spicer	125
126	GMC, 31A	2,500	Continental, N	4	3½x5-22.5	FS	Monarch	P	T, Own	N	Marvel	G	M, Eisemann	N	M, Own	S, 4	Own	N	Own	126
127	Graham, A	2,295	Continental	4	3½x4-22.5	FS	Monarch	T	T, Long		Stromberg		M, Eisemann		M, Fuller	S, 3	Fuller	N	Kinsler-B	127
128	Gramm-Bernstein, 15	1,995	Continental, N	4	3½x5-22.5	FS	N	T	T, Own	N	Stromberg	G	B, Northeast	N	M, Fuller	S, 3	Fuller	N	Own	128
129	Gramm-Bernstein, 15W	2,500	Continental, N	4	3½x5-22.5	FS	N	T	T, Own	Y	Stromberg	G	B, Northeast	N	M, Fuller	I, 3	Own	N	Own	129
130	Grant, 10		Continental, N	4	3½x5-22.5	S	Pierce	T	C, Fedders	N	Carter	G	M, Splitdorf	Y	P, Borg & B	S, 3	Grant-Lees, 515	N	Arvac	130
131	Grant, 17		Continental, N	4	3½x5-22.5	S	Pierce	T	C, Fedders	N	Carter	G	M, Splitdorf	Y	P, Borg & B	S, 3	Brown-L, 35	N	Peters	131
132	Harvey, WEA	2,550	Buda	4	4½x5½-27.2		Monarch	P	T, Chicago		Zenith		M, Bosch		M, Fuller	S, 3	Fuller		Arvac	132
133	Hawkeye, K	2,150	Buda	4	3½x5½-22.5		Simplex	P	T, Ideal		Zenith		M, Eisemann		M, Fuller	S, 3	Fuller		Hartford	133
134	Huffman, C (int.)	1,695	Continental	4	3½x5-22.5	F		T	C		Zenith		M, Dixie		M, Fuller	S, 3	Fuller			134
135	Huffman, B (worm)	1,895	Continental	4	3½x5-22.5	F		T	C		Zenith		B, Northeast		M, Fuller	S, 3	Fuller			135
136	Hurlburt, A	2,850	Buda, IU	4	4x5½-25.6	FS	Duplex	P	T, Own		Flechter		M, Eisemann	N	M, Brown-L	S, 3	Brown-Lipe			136
137	Independent (Iowa)	1,890	Continental, N	4	3½x5-22.5	FS			T, Chicago		Stromberg		M, Bosch		M, Fuller	S, 3	Fuller			137
138	Indians, 20	2,750	Own	4	4½x5½-27.2	F	Pierce	P	T, Long	Y	Stromberg	G	M, Eisemann	N	P, Borg & B	S, 4	Brown-L, 35	N	Acme	138
139	International, K	2,300	Own	4	3½x5½-19.6	FS	Own	P	T, Own	Y	Holley	G	M, Bosch	N	M, Own	S, 3	Own	N	Own	139

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TRUCK SPECIFICATIONS

2,000 (Myers)—3,000 (International)

Line no.	Final drive (Bevel, Chain, Internal-gear, Spur-and-bevel, Worm) and make of rear axle and model number.	Hotchkiss drive? (Yes or No)	Differential (Bevel, Spur, Worm) and make.	Number and location of driving-wheels (Front, Rear).	Clearance under front and rear axles.	Service and emergency brakes (Contracting, Expanding).	Frame material (Pressed-steel, Rolled-steel) and make.	Front and rear springs (Cantaliver; 1-2, 3-4, or Full elliptic; Transverse).	Make of springs.	Leaves in front and rear springs.	Length and width of front and rear springs.	Driver's position (Left, Right).	Make of steering gear.	Turning-circle diameter (feet and inches).	Wheels (Iron, Steel, Wood) and make.	Wheel-base (standard).	Front and rear tire sizes (dual, pneumatic).	Weight of chassis (pounds).	Perc. of weight on rear axle when empty & when loaded.	Line no.
69	W, Chicago, C....	Y	B	2, R	10½, 10	E, E	P, Parish & B..	½, ½	Cleveland...	7, 8	36x2-50x3.....	L	C.A.S....	.....	W, E & O..	130	34x2½-34x4.....	2,850	50, 75	69
70	I, Clark, AS.....	N	B	2, R	14 , 14	C, C	R, Own.....	½, ½	Mather....	8, 10	35x2-46x2½....	L	Lavine...	48, 0	W, Royer...	133	35x5p-35x5p.....	3,200	50, 65	70
71	I, Clark, 1.....	Y	W	2, R	9½, 9½	C, C	P, Own.....	½, ½	Alloy.....	10, 12	37½x2½-52x2½..	L	Jacox....	47, 0	W, Auto...	130	34x3-34x4.....	3,400	44, 67½	71
72	W, Timken, 6352..	Y	W	2, R	10½, 10½	E, E	P.....	½, ½	Coghlin....	8, 10	40x2½-52x2½...	L	Ross.....	34, 0	W, Hayes..	136	34x3½-34x3½	3,350	.....	72
73	W, Sheldon.....	....	.....	2, R	.....	E, E	P, Parish & B..	½, ½	Tuthill.....	.....	.....	L	Lavine...	.....	W, Bimel..	144	36x3½-36x4.....	.....	.....	73
74	W, Timken, 6460..	Y	S	2, R	10 , 10	E, E	P, Garden City.	C, C	Tuthill....	8, 10	38x2½-50x2½...	L	Gemmer..	.....	W, Standard	136	36x3½-36x4.....	3,400	—, 70	74
75	I, Torbensen.....	....	.....	2, R	.....	....	P, Parish & B..	....	Champion..	....	.....	....	Ross.....	.....	W.....	132	34x3½x34x4.....	.....	.....	75
76	W,Sheldon, W1500	Y	B	2, R	9½, 10	E, E	P, Parish.....	½, ½	Perfection..	8, 13	38x2-50x2½.....	L	Lavine...	.....	W, Schwarz.	125	32x3½-32x4.....	2,750	75, 75	76
77	I, Torbensen, A...	Y	B	2, R	.....	C, E	P, Detroit.....	½, ½	Mather....	7, 11	39x2½-52½x2½..	L	Jacox....	.....	W.....	124	34x3-34x4.....	2,925	.....	77
78	W, Timken.....	....	.....	2, R	.....	E, E	R, Own.....	....	Merrill....	.....	.....	....	Ross.....	.....	W.....	128	34x4-34x5.....	.....	.....	78
79	W,Sheldon, W1500	Y	W	2, R	9½, 9	E, E	P, Savage.....	¾, ¾	Garden City	7, 10	36x2½-52x2½...	L	Ross.....	48, 0	W, Standard	120	34x3½-34x5.....	3,300	20, 70	79
80	W, Timken, 6456..	Y	B	2, R	9½, 9	E, E	P.....	½, ½	Mather....	8, 9	40x2½-50x2½...	L	Ross.....	42, 0	W, Bimel...	137	34x3½-34x5.....	3,470	—, 65	80
81	W, Timken, 6460..	N	B	2, R	11 , 11	E, E	P, Savage.....	½, ½	Detroit.....	10, 11	44x2½-56x3.....	L	Ross.....	53, 0	W, Hayes..	144	34x3½-36x5.....	4,395	—, 70	81
82	W, Sheldon.....	Y	W	2, R	10 , 11	....	P, Parish & B..	....	Mather.....	.....	3⅜x2½-54x2½....	L	.....	.....	W, Royer...	130	35x3p-35x5.....	.....	.....	82
83	W, Timken, 6352..	Y	B	2, R	10 , 11½	E, E	P, Parish.....	½, ½	Perfection..	.....	39½x2½-53½x2½..	L	Ross.....	.....	W.....	134	34x3½-34x4.....	.....	.....	83
84	I, Clark, 1D.....	Y	B	2, R	10 , 10	C, C	P.....	½, ½	Detroit.....	8, 11	38½x2-50x2½...	L	Gemmer..	45, 0	W, Wayne..	130	34x3½-34x4.....	2,820	53, 70	84
85	I, Torbensen, A...	Y	B	2, R	11 , 11½	C, E	P.....	½, ½	Tuthill.....	8, 11	37½x2-44x2½...	L	C.A.S....	36, 0	W, Schwarz.	124	34x4½p-34x5p.....	2,950	75, —	85
86	I, Clark, 1D.....	Y	B	2, R	10½, 11½	C, E	P, Detroit.....	½, ½	Detroit.....	8, 10	39x2½-52½x2½..	L	Jacox.....	.....	W.....	130	35x5p-36x6p.....	3,100	50, 70	86
87	W,Sheldon, W1501	Y	W	2, R	.....	E, E	P, Savage.....	½, ½	.....	.....	36x2½-48x2½...	L	Ross.....	.....	W,Schwarz.	132	34x3½-34x5.....	3,500	.....	87
88	W,Sheldon, W1501	Y	W	2, R	12½, 11	E, E	P.....	½, ½	Sheldon....	9, 12	40x2½-54x2½...	L	Jacox....	35, 0	W,Hoopes..	125	35x5p-35x5p.....	3,350	40, 70	88
89	W, Wis., 800D....	Y	B	2, R	.....	E, E	P.....	½, ½	Sheldon....	9, 11	36x2½-50x2½...	L	Gemmer..	.....	I, Smith....	130	35x5p-35x5p.....	3,600	25, 75	89
90	W, Timken.....	....	.....	2, R	.....	E, E	P, Parish.....	½, ½	Delaney.....	.....	.....	L	Ross.....	.....	W,Archibald	120	36x3½-36x4.....	.....	.....	90
91	W.....	Y	B	2, R	.....	E, E	P.....	½, ½	.....	8, 8	42x2½-50x2½...	L	.....	50, 0	W.....	135	36x3½-36x4.....	3,900	.....	91
92	W, Timken.....	....	.....	2, R	.....	....	P, Parish.....	....	Delaney.....	.....	.....	....	Lavine...	.....	.....	135	36x3½-36x5.....	.....	.....	92
93	W,Sheldon, W1501	N	B	2, R	10 , 8½	E, E	R, Illinois....	F, ½	Sheldon....	8, 9	38x2-50x2½.....	L	Wohlrab..	44, 0	W, Bimel...	134	34x3½-34x5.....	4,100	55, 65	93
94	I, Torbensen, A...	Y	B	2, R	.....	C, E	P, Parish & B..	½, ½	Mather....	8, 13	38x2½-54x2½...	L	Own	.....	W, Wayne..	131	34x3-34x5.....	3,300	.....	94
95	W, Timken, 6453..	....	.....	2, R	.....	E, E	R, Own.....	½, ½	Standard....	.....	.....	....	Lavine...	.....	W, Standard	135	36x3½-36x4.....	.....	.....	95
96	B, Columbia.....	....	.....	2, R	.....	C, E	P, Smith.....	½, ½	Tuthill.....	.....	.....	L	Gemmer..	.....	W, Mutual.	150	35x5p-35x5p.....	.....	.....	96
97	W, Timken, 6460..	Y	B	2, R	11 , 11	E, E	P, Savage.....	½, ½	Iron City...	8, 11	40x2½-50x2½...	L	Ross.....	.....	W, Bimel...	142	36x3½-36x6.....	3,700	—, 74	97
98	W, Timken, 6460..	Y	W	2, R	.....	E, E	P, Parish & B..	½, ½	Mather....	9, 9	39½x2½-53½x3..	L	Ross.....	.....	W, Schwarz.	144	34x3½-34x5.....	4,750	.....	98
99	W, Timken, 6460..	Y	B	2, R	9 , 9½	E, E	P.....	½, ½	Detroit.....	8, 12	38x2½-52x2½...	L	Ross.....	54, 0	W, Bimel...	141	34x3½-34x5.....	3,700	51, 80	99
100	I, Torbensen.....	Y	B	2, R	10½, 11½	C, E	R.....	½, ½	Detroit.....	8, 12	36x2-52½x2½...	L	Lavine...	.....	W, Bimel...	130	32x3½-32x4.....	3,070	—, 66	100
100a	W, Wisconsin.....	N	B	2, R	9½, 9½	E, E	R, Own.....	½, ½	Tuthill.....	.....	40x2½-50x3.....	L	Ross.....	42, 0	W,St.Mary's	152	36x3½-36x5.....	4,000	55, 75	100a
101	I, Clark, 1B.....	N	B	2, R	14 , 13	C, E	P, Parish & B..	½, ½	Higgins....	7, 12	40x2½-52x2½...	L	Lavine...	48, 0	W, Bimel...	132	35x5-35x5.....	2,800	30, 75	101
102	I, Russel.....	....	.....	2, R	.....	....	.....	....	.....	.....	.....	....	.....	.....	W.....	132	32x3½x32x4.....	.....	.....	102
103	I, Torbensen, C...	N	B	2, R	11 , 12	C, E	P.....	½, ½	Perfection..	8, 11	39x2½-56x3.....	L	Ross.....	54, 0	W, Schwarz.	144	36x3½-36x5.....	3,600	53, 65	103
104	I, Russel, PA.....	Y	B	2, R	10 , 13	C, E	P, Detroit.....	½, ½	Sheldon....	7, 15	38½x2½-47½x2½ .	L	Lavine...	57, 0	W, Wayne..	136	34x3½-34x5.....	3,520	—, 90	104
105	W,Sheldon, W1501	N	B	2, R	.....	E, E	P, Parish & B..	½, ½	Sheldon....	7, 10	39x2½-48x3.....	L	Gemmer..	.....	W, Hoopes.	140	36x3½-36x5.....	3,550	52, 74	105
106	W, Timken, 6460..	Y	B	2, R	10½, 11	E, E	R.....	½, ½	Mather....	8, 11	40x2½-54x3.....	L	Gemmer..	.....	W, Standard	144	36x3½-36x5.....	3,900	60, 75	106
107	W, Timken, 6460..	N	B	2, R	10½, 10	E, E	P, Parish & B..	½, ½	Perfection..	9, 9	36x2½-52x3.....	L	Ross.....	.....	W, Bimel...	146	36x3½-36x6.....	3,750	51, 78	107
108	W.....	....	.....	2, R	.....	E, E	.....	½, ½	.....	.....	.....	....	.....	.....	.....	144	36x4-36x6.....	.....	.....	108
109	B, Standard, C....	Y	B	2, R	10 , 12	C, E	P.....	½, ½	Marathon..	7, 12	36½x2-50½x3...	L	Gemmer..	56, 0	W, Moline..	130	33x4p-33x4.....	3,240	60, 70	109
110	I, Torbensen, A...	Y	B	2, R	11, 12½	C, E	P, Detroit.....	½, ½	Detroit.....	8, 11	36x2¼-50x3.....	L	Jacox....	50, 0	W, Bimel...	134	36x6-36x6.....	3,200	.....	110
111	W, Timken.....	....	.....	2, R	.....	E, E	P, Parish & B..	½, ½	Spring Perch	.....	.....	L	Ross.....	.....	W, Crane...	140	36x3½-36x5.....	.....	.....	111
112	W, Sheldon.....	Y	W	2, R	.....	E, E	R, Own.....	½, ½	Mather....	9, 11	38x2½-50x2½...	L	Lavine...	.....	W, Bimel...	136	36x3½-36x5.....	.....	.....	112
113	W, Own.....	Y	B	2, R	10½, 10½	F, F	P, Savage.....	½, ½	Perfection..	7, 11	37x2-54x2½.....	L	Ross.....	44, 0	W, Prudden	140	34x3½-34x5.....	3,300	50, 80	113
114	W, Wisconsin.....	....	.....	2, R	.....	E, E	P, Savage.....	½, ½	Iron City...	.....	.....	L	Ross.....	.....	W, Jones...	144	35x3½-34x5.....	.....	.....	114
115	W, Chicago, C....	Y	B	2, R	10, 12	E, E	P, Own.....	½, ½	Maremont..	7, 9	35x2½-52x2½...	L	Lavine...	42, 0	W, Crane...	126	34x4-34x5.....	3,280	50, 75	115
116	I, Torbensen.....	....	.....	2, R	.....	E, E	P, Detroit.....	½, ½	Detroit.....	.....	.....	L	.....	.....	W, Crane...	140	35x5-36x6.....	.....	.....	116
117	W, Wisc., 800H...	Y	W	2, R	10, 10	E, E	P.....	½, ½	Perfection..	9, 11	40x2½-48x2½...	L	Ross.....	54, 0	W, Bimel...	128	34x5-34x5.....	4,120	40, 70	117
118	W.....	Y	W	2, R	.....	E, E	P.....	½, ½	Mather....	8, 10	40x2½-53x2½...	L	Gemmer..	.....	W, Prudden	144	36x3½-36x5.....	4,000	50, 90	118
118a	I, Torbensen.....	....	.....	....	.....	....	.....	....	Own.....	.....	.....	....	Ross.....	.....	.....	127	34x3½-34x5.....	3,725	.....	118a
119	W, Sheldon.....	Y	B	2, R	11, 11½	E, E	P, Parish & B..	½, ½	Penn.....	9, 9	39x2½-50x2½...	L	Ross.....	.....	W, Prudden.	145	35x5p-38x7p.....	.....	.....	119
120	W, Timken.....	....	.....	2, R	.....	....	P.....	....	.....	.....	.....	....	.....	.....	.....	144	34x3½-36x5.....	.....	.....	120
121	W, Standard, 603.	Y	B	2, R	10½, 10	E, E	R, Own.....	½, ½	Mather....	8, 11	41x2½-56x3.....	L	Ross.....	.....	W, Prudden.	136	34x3½-34x6.....	3,500	50, 70	121
122	W, Timken, 6560..	N	B	2, R	12½, 9	E, E	P.....	½, ½	Mather....	9, 9	40x2½-54x3.....	L	Gemmer..	46, 3	W, Auto....	144	36x3½-36x5.....	4,250	56, 69	122
123	W, Sheldon.....	....	.....	2, R	.....	E, E	R, Own.....	½, ½	Own.....	.....	.....	....	I, Smith....	.....	W, Prudden.	120	36x3½-36x5.....	.....	.....	123
124	W, Timken, 6460..	Y	W	2, R	12, 10¼	E, E	P.....	½, ½	Tuthill.....	9, 12	44x2½-52x3.....	L	Ross.....	42, 0	W, Prudden.	142	36x3½-36x5.....	3,800	50, 20	124
125	W,Sheldon,W-1500	Y	B	2, R	13, 9½	E, E	P, Hydraulic..	½, ½	Mather....	6, 11	38x2-48x2½.....	R	Jacox.....	.....	W, Wayne..	138	34x3½-34x5.....	3,600	55, 75	125
126	W, Timken, 6460..	N	B	2, R	10¼, 9½	E, E	P, Smith.....	½, ½	Detroit.....	8, 10	36x2½-54x3.....	L	Jacox....	51, 0	W.....	130	36x3½-36x5.....	4,110	55, 74	126
127	I, Clark.....	Y	B	2, R	11, 11	C, E	P, Own.....	½, ½	Perfection..	10, 11	40x2½-52x2½...	L	Ross.....	51, 0	W, Bimel...	138	36x3½-36x5.....	3,800	69, 90½	127
128	W, Standard.....	Y	B	2, R	11,	E, E	P.....	½, ½	Perfection..	10, 11	40x2½-52x2½...	L	Ross.....	51, 0	W, Bimel...	138	36x3½-36x5.....	4,200	69, 90½	128
129	I,Torbensen.....	....	.....	2, R	.....	....	.....	½, ½	.....	.....	42x2½-52x3.....	....	Lavine...	.....	S, Djsteel..	133	35x5p-36x6.....	3,400	— ,80	129
130	I, Torbensen, A...	Y	B	2, R	10, 10½	C, E	P.....	½, ½	Perfection..	11, 12	42x2½-50x2½...	L	Jacox....	39, 0	W, Royer...	124	34x4p-34x5.....	3,250	44½, 64½	130
131	I, Torbensen, A...	Y	B	2, R	10, 10½	C, E	P.....	½, ½	Perfection..	11, 12	42x2½-50x2½...	L	Jacox....	45, 0	W, Royer...	140	38x7p-38x7p.....	3,450	47½, 69	131
132	W, Sheldon.....	....	.....	....	.....	E, E	P, Own.....	....	Sheldon....	.....	.....	L	Ross.....	.....	W, Schwarz.	128	34x3½-34x5.....	.....	.....	132
133	I, Clark.....	....	.....	2, R	.....	C, E	R, Own.....	½, ½	Detroit.....	.....	.....	L	Ross.....	.....	W, Bimel...	148½	34x3½-34x5.....	.....	.....	133
134	I, Torbensen.....	....	.....	2, R	.....	E, C	P.....	½, ½	Perfection..	.....	.....	....	Lavine...	.....	W.....	140	34x3½-34x5.....	.....	.....	134
135	W.....	....	.....	2, R	.....	E, E	P.....	½, ½	Perfection..	.....	.....	....	Lavine...	.....	W.....	140	34x3½-34x5.....	.....	.....	135
136	W, Hindley.....	....	.....	2, R	.....	E, C	P, Savage.....	½, ½	Perfection..	.....	.....	....	Ross.....	.....	W, Wayne..	148	34x4-34x5.....	.....	.....	136
137	I, Torbensen.....	....	.....	2, R	.....	C, E	P.....	....	.....	.....	.....	....	Lavine...	.....	W.....	135	34x3½-34x5.....	.....	.....	137
138	W, Sheldon, W-103	N	B	2, R	12½, 10½	E, E	R.....	F, ½	Sheldon....	9, 11	40x2½-50x3.....	L	Wohlrab..	48, 0	W, Bimel...	150	36x4-36x7.....	5,360	58, 68½	138
139	I, Own.....	....	B	2, R	10½, 11½	E, E	P.....	½, ½	.....	10, 14	41½x2½-56x3...	L	Ross.....	.....	W.....	128	36x3½-36x5.....	3,400	50, 67	139

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3,000 (Jumbo)—4,000 (Autocar) INTERNAL-COMBUSTION

Line no.	Brand name and model name or number	Price f. o. b. factory with seat and tires but without body.	Make of engine and model number.	Number of cylinders.	Bore and stroke, and N. A. C. C. horsepower.	Lubrication (Forced-feed, Splash).	Make of governor (None).	Water-circulation (Pump, Thermo-siphon).	Radiator (Cellular, Tubular) and make.	Radiator guard included in price? (Yes or No)	Make of carbureter.	Fuels (Distillate, Gasolene, Kerosene).	Ignition (Battery, Magneto) and make of magneto.	Electric starting and lighting included in price? (Yes or No)	Clutch (Cone, Multiple-disk, Plate) and make.	Transmission (Individual-clutch, Planetary, Sliding-gear) and number of forward speeds.	Make of transmission and model number.	Power take-off included in price? (Yes or No)	Make of universal joints.	Line no.
	3,000 Pounds—Cont'd.																			
140	Jumbo, 15		Buda, CTU	4	3¾x5½-22.5	F	N	P	T, Own	Y	Zenith	G	B, Northeast.	Y	M, Fuller	S, 3	Fuller, LTU-S	Y	Arvac	140
141	Kalamazoo, G		Continental	4	3¾x5-22.5	F	Pierce	P	T, G & O	Y	Stromberg	G	M, Bosch	Y	M, Fuller	S, 4	Fuller, G5	N	Acme	141
142	Kearns, N	2,000	Hers'l-Spill. 7000	4	3¾x5-19.6	FS	Pierce	T	B, Bush	N	Zenith	G	M, Berling	N	P, Borg & B	S, 3	Grant-Lees, 515	Y	Peters	142
143	Kelly-Springfield, K31	3,000	Own	4	3¾x5½-19.6	F	Pierce	P	C, Long	N	Zenith	G	M, Eisemann	N	C, Own	S, 3	Covert, GI	N	Own	143
144	Kelly-Springfield, K32	3,000	Own	4	3¾x5½-19.6	F	Pierce	P	C, Long	N	Zenith	G	M, Eisemann	N	C, Own	S, 3	Covert, GI	N	Spicer	144
145	Kissel, General Utility	2,275	Own	4	3¾x5½-24.0	S	Pierce	P	T, Fedders	N	Stromberg	G	M, Eisemann	N	M, Warner	S, 3	Warner, T38	N	Spicer	145
146	Kleiber, A	2,800	Continental, C4	4	4¼x5½-27.2	S	Pierce	P	C, Perfex	N	Stromberg	G	M, Bosch	N	M, Hele-Shaw	S, 4	Brown-L, 50-4	N	Spicer	146
147	K-Z	2,450	Continental, J4	4	3¾x5-22.5	F	Pierce	P	T, Chicago	Y	Stromberg	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 35	N	Thermoid	147
148	Larrabee, N		Continental, N	4	3¾x5-22.5	S	Simplex	T	T, Bush	N	Schebler	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 30	N	Universal	148
149	Maccar, L	2,750	Continental, C4	4	4¼x5½-27.2	F	Pierce	P	T, Own	N	Stromberg	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 35	N	Spicer	149
150	Mack, AB(chain)		Own	4	4x5-25.6	S	Own	P	H, El Arco	N	Zenith	G	M, Dixie	N	M, Brown-L	S, 4	Own	N	Spicer	150
151	Mack, AB(worm)		Own	4	4x5-25.6	S	Own	P	H, El Arco	N	Zenith	G	M, Dixie	N	M, Brown-L	S, 4	Own	N	Spicer	151
152	Mapleleaf, AA		Hinkley, HAA400	4	4x5¼-25.6	FS	Hinkley	P	T, McCord	Y	Stromberg	G	M, Bosch	N	M, Fuller	S, 3	Fuller, LTU5	N	Blood	152
153	Master, JI	2,390	Buda, OU	4	4¼x5½-27.2	S	McCanna	P	T, Own	N	Master	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU3	Y	Spicer	153
154	Master, JW	2,490	Buda, OU	4	4¼x5½-27.2	S	McCanna	P	T, Own	N	Master	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU3	Y	Spicer	154
155	Maxwell	1,322	Own	4	3¼x4½-21.0	S		T	T, Own	N	Johnson	G	B, Simms	Y	C, Own	S, 3	Own	N	Own	155
156	Menominee, H		Continental, C4	4	3¾x5-22.5	S	Monarch	T	C, G & O	N	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU2	N	Spicer	156
157	Moreland, 19B	2,930	Continental	4	4¼x5½-27.2	FS	N	P	T, Own	N	Miller	D	M, Dixie	N	M, Own	S, 4	Own	N	Thermoid	157
158	Myers, 80	1,875	Lycoming	4	3¾x5-19.6	FS	N	T	C, Standard	N	Zenith	G	M, Eisemann	N	P, Borg & B	S, 3	Grant-Lees	N	Universal	158
159	Napoleon, 11		Victory	4	3¾x5-19.6	F	N	T	T, Chicago	Y	Stromberg	G	B		M, Fuller	S, 3	Fuller, TU¾	N	Universal	159
160	National, GA		Waukesha, BUX	4	3¾x5½-22.5	S	Waukesha	P	C, McKinnon	N	Zenith	G	M, Eisemann	N	M, Brown-L	S, 3	Brown-L, 30	N	Spicer	160
161	Nelson & LeMoon, F1½		Continental, C4	4	4¼x5½-27.2	FS	Pierce	P	T, Chicago		Stromberg		M, Bosch		M, Brown-L	S, 3	Brown-L, 35		Thermoid	161
162	Noble, B30		Buda	4		FS	Pierce	P	T, Chicago		Stromberg		M, Eisemann		M, Fuller	S, 3	Fuller, LTU			162
163	Norwalk	1,750	Lycoming, K	4	3¾x5-19.6	FS	N		T, Chicago		Carter		B		P, Borg & B	S, 3	Grant-Lees, 515			163
164	O. K	2,450	Buda	4	4¼x5½-27.2	FS	Pierce	T	T, Candler		Zenith		M, Eisemann		M, Muncie	S, 3	Muncie			164
165	Old Hickory, N	995	Lycoming, K	4	3½x5-19.6			T	C, Standard		Carter		M, Connectic		C, Lycoming	S, 3	Grant-Lees			165
166	Old Reliable, A	2,350	Wisconsin, EU	4	4x5-25.6	F	N	P	T, Chicago	Y	Stromberg	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 35	N	Spicer	166
167	Packard, 1¼E	3,200	Own	4	4x5½-25.6	F	Own	P	T, Fedders	N	Own	G	M, Dixie	N	M, Own	S, 4	Own	N	Spicer-Th	167
168	Paige, 52-19			4	4x5½-25.6			P	T	Y	Stromberg	G	M, Bosch	N	M, Brown-L	S, 4	Brown-Lipe	N	Spicer	168
169	Patriot, Lincoln	2,450	Hinkley, HAA400	4	4x5¼-25.6	F	Hinkley	P	T, Own	N	Stromberg	G	M, Splitdorf	N	M, Covert	S, 4	Fuller, G5	N	Thermoid	169
170	Rainier, R6	2,150	Continental, N	4	3¾x5-19.6	FS	Monarch	T	C, Harrison	N	Zenith	G	M, Simms	N	M, Brown-L	S, 3	Brown-L, 25	Y	Hartford	170
171	Reliance, A10	2,500	Buda, ITU	4	4x5¼-25.6	F	Pierce	P	T, Bush	N	Stromberg	G	M, Eisemann	Y	M, Fuller	S, 3	Fuller, TU3	N	Peters	171
172	Republic, 11X		Continental, N	4	3¾x5-22.5	FS	Ruggles	T	C, Own	N	Stromberg	G	M		M, Fuller	S, 3	Fuller, TU¾	N	Hartford	172
173	Reynolds, 3A	2,875	Own	4	4x5¼-26.5	F	Hinkley	P	T, Own	Y	Stromberg	dgk	M, Teagle	Y	M, Own	S, 4	Own	N	Thermoid	173
174	Royal	2,800	Wisconsin	4	3¾x5-22.5		Monarch	P	T, Kells		Stromberg		M, Bosch		P, Borg & B	I, 3	Own			174
175	Sandow, CG	2,190	Continental, N	4	3¾x5-22.5	S	N	P	T, Chicago	Y	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU¾	N	Spicer	175
176	Schwarts, B2	2,175	Continental, J4	4	3¾x5-22.5	F	Pierce	P	C, Fedders	N	Stromberg	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 35	N	M & E	176
177	Selden, 1¼A		Continental, N	4	3¾x5-22.5	S	Pierce	P	T, Long	N	Stromberg	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 30	N	Spicer	177
178	Service, 31	2,985	Buda, IU	4	4x5½-25.6	F	Simplex	P	T, Long	N	Stromberg	G	M, Eisemann	N	P, Borg & B	S, 4	Brown-L, 50	N	Spicer	178
179	Service, 36	3,415	Buda, HU	4	4¼x5½-28.9	F	Simplex	P	T, Long	N	Stromberg	G	M, Eisemann	N	P, Borg & B	S, 4	Brown-L, 50	N	Spicer	179
180	Signal, H	2,925	Continental, C4	4	4¼x5½-27.2	FS	Pierce	P	T, McCord	Y	Stromberg	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 35	N	Spicer	180
181	Southern, 15		Continental, N	4	3¾x5-22.5	FS	Pierce	T	T, Standard	N	Zenith		M, Bosch	N	P, Borg & B	S, 3	Fuller	N	Spicer	181
182	Sterling	2,850	Own	4	4x5½-25.6	F	Waukesha	P	C, Own	Y	Rayfield	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 35	N	Spicer	182
183	Stewart, 9	2,250	Continental, N	4	3¾x5-22.5	FS	N	T	T, Bush	N	Zenith	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU¾	N	Hartford	183
184	Stoughton, B			4	3¾x5-22.5	F		P	T		Stromberg		M, Eisemann		M	S, 3	Brown-Lipe			184
185	Sullivan, F	2,975	Buda, M	4	3¾x4½-22.5	S	N	T	T, Bush	N	Stromberg	G	M, Bosch	N	C, Hartford	S, 3	Covert, GI	N	Hartford	185
186	Texan, TK	1,525	Lycoming	4	3½x5-19.6	S	N	T	C, Own		Carter		B		P, Borg & B	S, 3	Muncie			186
187	Tiffin, GW	2,415	Continental, C4	4	4¼x5½-27.2	FS	Pierce	P	T, Own	Y	Schebler	G	M, Bosch	N	M, Fuller	S, 3	Fuller, GU3	Y	Peters	187
188	Tower, J	2,820	Continental, C4	4	4¼x5½-27.2	FS	Pierce	P	T, Own	N		G	M	N	M, Fuller	S, 3	Fuller, LTU	N		188
189	Transport, 30	2,250	Continental, N	4	3¾x5-22.5	FS	Simplex	T	C, Spirex	Y	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, LTU4	N	Hartford	189
190	Traylor, C	2,875	Buda, ITU	4	4x5½-25.6	F	Pierce	P	T, G & O	N	Zenith	G	M, Dixie	N	M, Covert	S, 3	Covert	N		190
191	Triangle, A	2,185	Waukesha, BU4	4	3¾x5½-22.5	S	Waukesha	P	T, Perfex	N	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU3	N	Detroit	191
192	Ultimate, A		Buda, ITU	4	4x5¼-25.6	F	Pierce	P	T, Own	N	Stromberg	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 35	N	Spicer	192
193	United		Buda	4	3¾x5½-22.5						Stromberg				M	S, 3	Brown-Lipe			193
194	Universal, G		Buda	4	3¾x5-22.5		Monarch	P	T, Bremer		Zenith		M, Eisemann		P, Own	S, 3	Own			194
195	U. S., N	2,150	Continental	4	3¾x5-22.5		Monarch	P	T, Long		Stromberg		M, Eisemann		M, Brown-L	S, 3	Brown-L		Blood	195
196	Velie, 46	1,925	Continental, N	4	3¾x5-22.5	FS	Monarch	P	T, Own	N	Stromberg	G	M, Berling	N	P, Borg & B	S, 3	Durston 034000	N	Arvac	196
197	Victor (Mich.), A		Continental, N	4	3¾x5-22.5	F	N	T	Modine		Stromberg		M, Eisemann		M, Fuller	S, 3	Fuller, LTU	Y	Acme	197
198	Watson, 20		Waukesha, BUX	4	3¾x5½-22.5	S	Waukesha	P	T, R'me-T'r'y	N	Stromberg	G	M, Simms	N	M, Brown-L	S, 3	Brown-L, 35	N	M & E	198
199	White Hickory, H	2,475	Continental, N	4	3¾x5-22.5	FS	Simplex	P	T, Chicago	Y	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU¾	N	Arvac	199
200	Wichita L	2,350	Own	4	3½x5-19.6			T	T, Perfex		Stromberg				C	S, 3	Covert		Own	200
201	Wilcox, B		Own	4	4¼x5-28.9	S	Pierce	P	T, Long	N	Stromberg	G	M, Bosch	N	C, Own	S, 4	Own	N		201
202	Wilson	2,450	Continental, N	4	3¾x5-22.5	FS	Pierce	P	T, Own	N	Marvel	G	M, Eisemann	N	P, Borg & B	S, 4	Brown-L, 35		Thermoid	202
203	Winther, 39	2,450	Wisconsin, CAU	4	3¾x5-22.5	F	N	P	T, Bremer	N	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU¾	N	Peters	203
204	Winther, 430	2,850	Wisconsin, CAU	4	3¾x5-22.5	F	N	P	T, Bremer	N	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, LTU4	N	Arvac	204
205	Wisconsin, B	1,750	Waukesha	4	3¾x5½-19.6		Waukesha	P	T, Chicago		Master		M, Eisemann		M, Fuller	S, 3	Fuller			205
206	Witt-Will, N Special	2,150	Continental	4	3¾x5-22.5		Pierce	P	C, Bremer		Zenith		M, Eisemann	N	M, Brown-L	S, 3	Brown-Lipe		Spicer	206
207	Wolverine, C		Continental	4	3¾x5-22.5		Monarch	T	T, Long		Stromberg		M, Bosch	Y	M, Fuller	S, 3	Fuller		Universal	207
	3,500 Pounds:																			
208	Air-O-Flex, C		Buda, CTU	4	3¾x5½-22.5	F	Duplex	F	T, Spirex	N	Stromberg	G	M, Splitdorf	Y	P, Borg & B	S, 4	Brown-L, 35	N	Thermoid	208
209	Oneida, BA	2,385	Own	4	4x5-25.6	FS	Own	P	T, Modine		Stromberg		M, Bosch		M, Own	I, 3	Own			209
	4,000 Pounds:																			
210	Acme, A	3,050	Continental, C4	4	4¼x5½-27.2	FS	Duplex	P	T, G & O	N	Rayfield	G	M, Eisemann	N	P, Borg & B	I, 4	Cotta, R	N	Blood	210
211	Atco, W20	2,875	Buda, HU	4	4¼x5½-28.9	F	Pierce	T	T, Chicago	Y	Stromberg	G	M, Bosch	N	M, Fuller	S, 4	Fuller, G	Y	Hartford	211
212	Autocar, 21U F	2,300	Own	2	4¼x4½-18.0	S	N	P	T, Own	N	Stromberg	G	M, Bosch	N	P, Own	S, 3	Own	N	Spicer	212

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TRUCK SPECIFICATIONS

3,000 (Jumbo)—4,000 (Autocar)

Line no.	Final drive (Bevel, Chain, Internal-gear, Spur-and-bevel, Worm) and make of rear axle and model number.	Hotchkiss drive? (Yes or No)	Differential (Bevel, Spur, Worm) and make.	Number and location of driving-wheels (Front, Rear).	Clearance under front and rear axles.	Service and emergency brakes (Contracting, Expanding).	Frame material (Pressed-steel, Rolled-steel) and make.	Front and rear springs (Cantaliver; 1-2, 3-4, or Full elliptic; Transverse).	Make of springs.	Leaves in front and rear springs.	Length and width of of front and rear springs.	Driver's position (Left, Right).	Make of steering gear.	Turning-circle diameter (feet and inches).	Wheels (Iron, Steel, Wood) and make.	Wheel-base (standard).	Front and rear tire sizes (dual, pneumatic).	Weight of chassis (pounds).	Perc. of weight on rear axle when empty & when loaded.	Line no.
140	I, Clark, 1D	Y	B	2, R	11, 13½	C, E	P	½, ½	Perfection	9, 11	40x2½-52x2½	L	Jacox	35, 0	W	144½	36x3½-36x5	3,600	50, 75	140
141	W, Wisc., 800F	N	W	2, R	9, 9½	E, E	R	½, ½	Sheldon	8, 10	40x2½-48x2½	L	Ross	51, 8	W, Bimel	144	36x4-36x5	5,080	—, 80	141
142	I, Torbensen, B	Y	S	2, R	14, 11	E, E	P	½, ½	Mather	6, 9	42x2½-52x3	L	Lavine		W, E & O	136	34x3½-34x6	3,620	68, 80	142
143	C, Own	N	B	2, R	11½, 10½	E, E	P	½, ½		10,11	40½x2½-43½x2½	L	Gemmer	48, 0	W	144	36x3½-36x6	4,590	50, 90	143
144	W, Own	N	B	2, R	11½, 10½	E, E	P	½, ½		10 12	40½x2½-47½x2½	L	Gemmer	48, 0	W	144	36x3½-36x6	4.685	50, 90	.44
145	W,Sheldon,W-1500	Y	W	2, R	12⅝, 11	E, E	P, Smith	½, ½	Mather	10,11	38x2½-50x2½	L	Jacox	50, 0	W, Prudden	152	36x3½-36x5	3,890	51½, 69	145
146	W, Sheldon, W-103	Y	W	2, R	9½, 10½	E, E	R, Own	½, ½	Betts	8, 11	44x2½-52x3	R	Ross		W,Waterh'se	143	36x3½-36x6	4,900	50, 75	146
147	W, Timken, 6460	N	B	2, R	12½, 10½	E, E	R, Own	½, ½	Tuthill	7, 9	40x2½-50x3	L	Lavine	30, 2	W, St. M'ry	134	36x3½-36x5	4,000		147
148	W,Sheldon,W-1500	Y	B	2, R	10½, 9½	E, E	P, Savage	½, ½	Merrill	7, 9	38x2½-53x2½	L	Ross		W, Hoopes	130	34x3½-34x5	3,600	36, 88	118
149	W, Timken, 6460	N	B	2, R	10½, 10½	E, E	P, Parish	½, ½	Merrill	7, 12	42x2½-54x2½	L	Ross		S, Dayton	150	36x4-36x5	4,300	—, 70	149
150	C, Own	N	B	2, R	13½, 13½	C, E	P, Own	½, ½	Merrill	8, 9	40x2½-48x3	L	Own	50, 0	W, Own	144		4,800	46, 67	150
151	W, Sheldon	Y	W	2, R	13½, 9½	E, E	P, Own	½, ½	Merrill	8, 9	40x2½-48x3	L	Own	50, 0	W, Own	144		4,900	47, 69	151
152	W,Sheldon,W-103	Y	B	2, R	9, 9½	E, E	R	½, ½	Sheldon		42x2½-50x3	L	Ross		W, Hayes	144	34x4-36x6	2,600	50, 70	152
153	I, Torbensen, C	Y	B	2, R	9½, 11½	C, E	P, Parish & B	½, ½	Detroit	8, 10	44x2-52x2½	L	Ross	42, 0	W, Prudden	142	34x3½-34x5	3,800	55, 78	153
154	W, Timken, 6460	Y	B	2, R	9½, 9½	E, E	P, Parish & B	½, ½	Detroit	8, 10	44x2-52x2½	L	Ross	42, 0	W, Prudden	142	34x3½-34x5	3,800	55, 78	154
155	W, Own	Y	B	2, R	13, 11	E, E	P	½, ½	Detroit	7, 11	38x2½-52x2½	L	Own	52, 2	W, Kelsey	124	32x3-32x4	2,350	20, 66	155
156	W, Timken, 6552	N	B	2, R		E, E	R, Own	½, ½	Tuthill	10, 11	43x2½-52x3	L	Ross		W, Standard	144	36x3½-36x5	4,000		156
157	W, Timken, 6456	N	W	2, R	10½, 8½	E, E	P	½, ½	U. S.	6, 10	38x2½-48x3	L	Ross	50, 0	I. Smith	126	36x3½-36x5	4,150	50, 65	157
158	W, Chicago, C	Y	B	2, R	10½, 10	E, E	P, Parish & B	½, ½	Cleveland	8, 9	36x2-50x3	L	C.A.S.		W, E & O	144	34x3½-34x5	3,200	50, 75	158
159	I, Clark, 1D	N	B	2, R	14, 13	C, C	R, Own	½, ½	Mather	9, 12	35x2-46x2½	L	Lavine	48, 0	W, Royer	133	35x5p-36x5p	3,400	50, 65	159
160	W, Timken, 6460	Y	W	2, R	10½, 9½	E, E	P	½, ½	Coghlin	7, 10	40x2½-52x3	L	Ross	48, 0	W, Hayes	140	34x4-34x5			160
161	W Timken, 6552	Y		2, R		E, E	R, Own	½, ½	Tuthill				Lavine		W, Prudden		36x3½-36x6			161
162	W,Sheldon,W-103			2, R		E, E	P, Parish & B	½, ½	Tuthill				Lavine		W, Bimel	144	36x3½-36x5			162
163	W, Chicago, C			2, R		E, E	P, Own	½, ½	Standard				Lavine		W, E & O	130	34x3½-34x5			163
164	W, Chicago			2, R		E, E	P, Savage	½, ½	Tuthill				Ross		W, Bimel	146	36x3½-36x5			164
165	B, Salisbury			2, R		C, E	R, Detroit		Tuthill				Lavine		W, Bimel	112	33x4-33x4			165
166	W, Sheldon, W21	Y	W	2, R	11, 9½	E, E	P	½, ½	Sheldon	9, 13	39x2½-54x3	R	Ross		W, Prudden	138	34x4-36x6	4,150	—, 90	166
167	W, Own	N	S	2, R	9⅝, 9½	C, E	R, Own	½, ½		10, 11	41x2½-46x2½	L	Own	50, 0	W	144	34x3½-34x3½d	4,670	46, 67	167
168	W, Timken	N	B	2, R		E, E	P	½, ½	Perfection	8, 10	42x2½-52x3	L	Jacox		W, Schwars	140	34x3½-34x5	4,200	60, 40	168
169	W, Empire, N	Y	B	2, R	11, 11½	E, E	P, Detroit	½, ½	Cooper	8, 13	40x2½-52x2½	L	Ross	46, 6	W, Bimel	140	34x3½-34x5	3,900	45, 75	169
170	W,Sheldon,W-1500	Y	B	2, R	9½, 10	E, E	P, Parish	½, ½	Perfection	8, 14	38x2-50x2½	L	Lavine		W, Schwars	133	34x3-34x4	3,000	75, 75	170
171	E, Own	Y	B	2, R	10, 11½	E, E	P, Savage	½, ½	Sheldon	8, 11	36x2½-56x2½	L	Ross		W, Bimel	150	36x3½-36x5	4,500	35, 85	171
172	I, Torbensen, B	Y	W, Powrlok	2, R		E, E	P, Detroit	½, ½	Mather	8, 15	39x2½-52½x2½	L	Jacox		W	144	34x3½-34x5	3,300		172
173	W, Own	Y	B	2, R	13½, 10½	E, E	R, Standard	½, ½	Own		40x2½-54x3	L	Own		I. Smith	140	36x3½-36x6			173
174	W, Timken			2, R		E, E	R, Own		Merrill				Ross		W	128½	34x4-34x5			174
175	W,Sheldon, W1500	Y	W	2, R	9½, 9	E, E	P, Savage	½, ½	Garden City	7, 12	36x2½-52x2½	L	Ross	54, 0	W, Standard	135	34x3½-34x5	3,900	20, 70	175
176	I, Torbensen, B	Y	B	2, R	10, 11½	C, E	P, Parish	½, ½	Rowland	7, 13	38½x2½-54x3	L	Ross		W, Schwars	140	34x3½-34x5	3,600		176
177	W, Timken, 6460	Y	B	2, R	—, 9½	E, E	P, Parish & B	½, ½	Perfection	10, 10	40x2½-50x2½	R	Lavine	48, 0	W	137½	34x3½-34x5	3,560	56, 75	177
178	W, Timken, 6560	Y	B	2, R	11½, 9½	E, E	P, Own	½, ½	Mather	9, 11	42x2½-54x3	L	Ross	46, 0	W, Bimel	150	36x3½-36x6	4,850	—, 65	178
179	W, Timken, 6560	Y	B	2, R	11½, 10½	E, E	P, Own	½, ½	Mather	9, 11	42x2½-54x3	L	Ross	46, 0	W, Bimel	150	35x5p-38x7p	4,900	—, 65	179
180	W, Timken, 6460	N	B	2, R	11, 11	E, E	P, Savage	½, ½	Detroit	10, 11	44x2½-56x3	L	Ross	53, 0	W, Hayes	144	34x4-36x6	4,760	—, 73	180
181	W, Sheldon	Y	W	2, R			P, Parish & B		Mather		38x2½-54x2½	L			W, Royer	143	34x3½-34x5d			181
182	W, Timken, 6460	N	W	2, R	10½, 10½	E, E	P	½, ½	Mather	8, 10	48x3-54x3	L	Ross	57, 2	W, Prudden	142	36x3½-36x5	4,720	51, 91	182
183	I, Clark, 1D	Y	B	2, R	10, 10	C, C	P,Hydraulic	½, ½	Detroit	8, 11	41x2½-54x3	L	Gemmer	49, 0	W, Wayne	140	34x3-34x5	3,440	56, 70	183
184	W, Sheldon			2, R		E, E	P, Smith	½, ½							W	140½	36x3½-36x5			184
185	W, Timken, 6560	Y	B	2, R	10½, 10	E, E	R, Own	½, ½	Merrill	9, 9	38x2-52x3	L	Ross	45, 0	W, Wayne	129	36x3-36x5	3,500	54, 68	185
186	W, Chicago			2, R		E, E	P, Parish & B	½, ½	Maremont				C.A.S.		W	144	34x4p-34x5			186
187	W, Sheldon, W102	N	R	2, R	10, 12	E, E	P	½, ½	Kalamazoo	9, 11	40x2-48x2½	L	Ross	47,0	I. Smith	135	36x3½-36x5	3,650	40, 60	187
188	W, Timken	N	B	2, R	11, 11	E, E	P	½, ½	Detroit		42x2½-52x2½	L	Ross		W	142	35x5p-38x7p	3,800	—, 75	188
189	I, Clark, 1D	Y	B	2, R	11½, 12½	C, E	P, Detroit	½, ½	Detroit	7, 10	40x2½-54x3	L	Jacox		W	140	35x5p-38x7p	3,450	50, 70	189
190	W, Sheldon, W103	Y	W	2, R		E, E	P, Savage	½, ½			38x2½-50x2½	L	Ross		W, Schwars	138	36x4-36x6	4,700		190
191	I, Clark, 1D	Y	W, Powrlok	2, R	9½, 10	C, C	R, Mason	½, ½	Detroit	9, 11	42½x2½-54x2½	L	Gemmer	47, 6	W, Royer	144	34x3½-34x6	3,750	60, 80	191
192	W, Sheldon, W103	Y	B	2, R	9½, 10½	E, E	P	½, ½	Sheldon	9, 13	39x2½-52x2½	L	Ross	47, 0	W	140	36x3-36x5	4,500	50, 70	192
193	I, Clark			2, R			P	½, ½				L			W	145	34x3½-34x5			193
194	W, Own			2, R		E, E	P	½, ½	Kalamazoo				Lavine		W	133	34x3½-34x5			194
195	I, Clark			2, R		C, E	P		Sheldon			L	Lavine		W, Schwars	144	36x3½-36x5			195
196	I, Torbensen, C	Y	W	2, R	10½, 12	C, E	P, Dunbar	½, ½	Mather	8, 11	40x2½-54x3	L	Ross	46, 0	W, Bimel	133	36x3½-36x5	3,650	52½, 85	196
197	I, Clark	Y	B, W	2, R	12, 12	C, E	R, Own	½, ½	Tuthill	7, 10	36x2½-48x3	L			W, Prudden	140	-x4-x5	3,250	80, 80	197
198	W, Empire, N	Y	B	2, R	10, 10½	E, E	P, Parish	½, ½	Sheldon		40x2½-52x3	L	Lavine		W,Crane	144	36x3½-36x5			198
199	W, Timken, 6460	Y	W	2, R	10½, 10½	E, E	P, Smith	½, ½	Sheldon	8, 10	31½x2½-50x3	L	Ross	51, 0	W, Bimel	144	36x3½-36x5	3,750	54, 66	199
200	W, Sheldon			2, R									Ross		Own	144	36x3½-36x5			200
201	W, Wisc., 800E	Y	B	2, R		E, E	P	½, ½	Sheldon	9, 10	40x2½-52x3	L	Own		I. Smith	144	36x4-36x5	4,600	25, 75	201
202	W, Timken, 6460	Y	B	2, R	10½, 10½	E, E	R	½, ½	Perfection	8, 12	38x2½-52x2½	L	Ross		W	140	36x3½-36x5	3,800		202
203	I, Clark, 1D	Y	B	2, R	10, 11½	C, C	R, Own	½, ½	Detroit	9, 12	40x2½-48x2½	R	Lavine	56, 0	I. Own	140	34x3½-34x5	3,600	40, 75	203
204	I, Clark, 1D	Y	B	4, FR	11½, 10½	C, C	R	½, ½	Detroit	9, 12	40x2½-48x2½	L	Lavine	58, 0	I. Own	132	32x4-32x4	4,100	30, 60	204
205	W, Sheldon			2, R		E, E	P, Smith						Lavine		W	136	34x3½-34x4			205
206	W Timken			2, R		E, E	P, Parish	½, ½	Delaney			L	Ross		W,Arch'ld	120	36x3½-36x5			206
207	I, Russel			2, R		C, E	P, Parish & B	½, ½	Tuthill			L	Gemmer		W	140	34x3½-34x5			207
208	I, Russel, P1-300	N	B	2, R	15, 14	E, C	P					L	Ross		W	150	36x3½-36x5	4,000	40, 70	208
209	W, Own			2, R		E, E	P, Own	½, ½	Mather				Ross		W	135	36x3½-36x5			209
210	W, Timken, 6560	Y	B	2, R	11½, 9½	E, E	P	½, ½	Detroit	8, 12	40x2½-52x3	L	Ross	54, 0	W, Bimel	148	36x4-36x7	4,450	52, 80	210
211	W. Wisc., 800J	Y	B	2, R	12½, 10½	E, E	P, Parish & B	½, ½	Sheldon	9, 11	41x2½-52x3	L	Ross	61, 2	I. Smith	150	36x4-36x7	4,800	53, —	211
212	S. Own	Y	B	2, R		C, E	P	½,1T				R	Own		W	97		3 600		212

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4,000 (Available—Transport) INTERNAL-COMBUSTION

Line no.	Brand name and model name or number	Price f. o. b. factory with seat and tires but without body.	Make of engine and model number.	Number of cylinders.	Bore and stroke, and N. A. C. C. horse-power.	Lubrication (Forced-feed, Splash).	Make of governor (None).	Water-circulation (Pump, Thermo-siphon).	Radiator (Cellular, Tubular) and make.	Radiator guard included in price? (Yes or No)	Make of carbureter.	Fuels (Distillate, Gasolene, Kerosene).	Ignition (Battery, Magneto) and make of magneto.	Electric starting and lighting included in price? (Yes or No)	Clutch (Cone, Multiple-disk, Plate) and make.	Transmission (Individual-clutch, Planetary, Sliding-gear) and number of forward speeds.	Make of transmission and model number.	Power take-off included in price? (Yes or No)	Make of universal joints.	Line no.
	4,000 Pounds—Cont'd.																			
213	Available, H 2	2,950	Continental C4	4	4½x5½-27.2	FS	N	P	T, Chicago	Y	Stromberg	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 35	N	Thermoid	213
214	Beck, C	2,350	Continental	4	4½x5½-27.2	F	Pierce	P	C, Ideal	Y	Stromberg	G	M, Bosch	N	M, Fuller	S, 3	Fuller, TU3	Y	Blood	214
215	Belmont, C	2,550	Buda, HU	4	4½x5½-28.9	F	Pierce	P	T, Chicago	Y	Zenith	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU	N	Sterling	215
216	Brinton, F	3,000	Continental, C4	4	4½x5½-27.2	FS	Pierce	P	T, Mayo	N	Stromberg	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 50		Spicer	216
217	Collier, 20		Continental	4	4½x5½-27.2		Monarch	P			Zenith		M, Eisemann		M, Fuller	S, 4	Fuller			217
218	Conestoga, 30	2,700	Continental, N	4	3½x5-22.5	FS	Duplex	T	T, E & M	N	Stromberg	G	M, Simms	N	M, Fuller	S, 3	Fuller, TU3	N	Sterling	218
219	Day-Elder, D	2,450	Continental	4	4½x5½-27.2		Monarch	P	T, Bush		Zenith		M, Berling		M, Fuller	S, 3	Covert		Hartford	219
220	Dearborn, BW	2,390	Buda	4	3½x5½-22.5	F	Simplex	T	T, Chicago	Y	Stromberg	G	M, Bosch	N	M, Fuller	S, 3	Fuller	N	Hartford	220
221	Defiance, E		Continental	4	3½x5-22.5		N	P	C, Perfex		Stromberg			Y	P, Borg & B	S, 3	Grant-Lees			221
222	DeKalb, E2	2,250	Continental	4	4½x5½-27.2		N	P	T, Jackson		Master		M, Eisemann		M, Fuller	S, 3	Fuller		Hartford	222
223	Denby, 134	2,450	Continental, N	4	3½x5-22.5	F	Monarch	T	T, Long	Y	Stromberg	G	M, Eisemann	N	M, Fuller	S, 4	Fuller, GU	N	Universal	223
224	Diamond T, U	3,285		4	4x5½-25.6	F		P	T, G & O	N	Stromberg	G	M, Bosch	N	M	S, 4		N	Spicer	224
225	Dorris, K4	3,400	Own	4	4½x5½-28.9	F	Own	P	T, McCord	Y	Stromberg	G	M, Bosch	N	M, Warner	S, 4	Warner, T53	N	Spicer	225
225a	Douglas, H (int.)	2,650	Buda	4	4½x5½-27.2	F	Pierce	P	Own		Schebler		M, Eisemann		M, Fuller	S, 3	Fuller		Arvac	225a
225b	Douglas, H (worm)	2,850	Buda	4	4½x5½-27.2	F	Pierce	P	Own		Schebler		M, Eisemann		M, Fuller	S, 3	Fuller		Arvac	225b
226	Erie			4	4½x5½-27.2		Pierce		T		Stromberg		M, Bosch		M	S, 4				226
227	Fargo, P	2,250	Continental, N	4	3½x5-22.5	FS	Monarch	T	T, Own	N	Rayfield	G	M, Bosch	N	M, Fuller	S, 4	Fuller, GU	N	Spicer	227
228	Federal, UE	2,900	Continental, C4	4	4½x5½-27.2	FS	Pharo	P	T, McCord	Y	Zenith	G	M, Eisemann	N	P, Borg & B	S, 4	Detroit, TUE	N	Spicer	228
229	Forschler, B	2,750	Continental	4	4½x5½-27.2		Duplex	P	T, Own		Zenith		M, Bosch		M, Fuller	S, 3	Fuller		Own	229
230	Fulton, C	2,350	Herschell-Spill	4	3½x5-16.9		Pierce	T	T, G & O		Carter		M, Simms	N	P, Borg & B	S, 3	Durston		Universal	230
231	Gabriel, E	3,250	Buda	4	4½x5½-28.9		Duplex	P	C, G & O		Rayfield		M, Bosch	N	P, Borg & B	S, 4	Brown-Lipe		Spicer	231
232	Garford, 70H	3,190		4	4½x5½-28.9	F	Simplex	P	T, Own	N	Rayfield	G	M, Splitdorf	N	M	S, 4		N		232
233	Giant, 16	3,050	Continental, C4	4	4½x5½-27.2	FS	Pierce	P	C, Own	Y	Schebler	G,K	M, Eisemann	N	M, Brown-L	S, 3	Brown-L, 35	N	Spicer	233
234	GMC, 41A	2,950	Continental, C2	4	4½x5½-27.2	FS	Monarch	P	T, Own	N	Marvel	G	M, Eisemann	N	M, Own	S, 4	Own	N	Own	234
235	Gramm-Bernstein, 20	2,900	Continental, C2	4	4½x5½-27.2	FS	Pierce	P	T, Own	Y	Stromberg	G	B, North East	N	M, Fuller	I, 4	Own	N	Own	235
236	Grant, 15		Continental, N	4	3½x5-22.5	S	Pierce	T	C, Fedders	N	Carter	G	M, Splitdorf	Y	P, Borg & B	S, 3	Grant-Lees, 515	N	Arvac	236
237	Hall	2,875	Continental, C4	4	4½x5½-27.2	FS	Simplex	P	T, Long	Y	Zenith	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 35	N	Spicer	237
238	Hendrickson	3,000	Buda, BU4R	4	4½x5½-28.9	S		P	T, Chicago		Stromberg		M, Dixie		M, Fuller	S, 4	Fuller			238
239	Independent (Iowa), F	2,290	Continental	4	4½x5½-27.2		N	P	C, Chicago				M, Bosch	N	M, Fuller	S, 3	Fuller		Blood	239
240	Independent (Ohio), G	2,300	Continental	4	4½x5½-27.2		Monarch	P	T, Long		Zenith		M, Eisemann		M, Fuller	S, 3	Fuller		Sterling	240
241	International, G	2,700	Own	4	4x5-25.6	FS	Own	T	T, Own	Y	Ensign	G	M, Dixie	N	M, Own	S, 3	Own	Y	Own	241
242	Jumbo, 20		Buda, CTU	4	3½x5½-22 5	F	N	T	T, Own	Y	Zenith	G	B, Northeast	Y	M, Fuller	S, 3	Fuller, LTUS	Y	Arvac	242
243	Keldon, 19	2,885	Buda	4	4½x5½-28.9		Waukesha	P	C, Eureka		Stromberg		M, Eisemann		P, Borg & B	S, 3	Covert		Acme	243
244	Kimball, B	3,675	Wisconsin, TU	4	4x6-25.6	FS	Duplex	P	C, Flexo	N	Zenith	D	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 35	N	Spicer	244
245	Kissel, Freighter	2,875	Own	4	4½x5½-28.9	S	Pierce	P	T, Fedders	N	Stromberg	G	M, Eisemann	N	M, Warner	S, 4	Warner, T53	N	Spicer	245
246	Kleiber, BB	3,200	Continental, C4	4	4½x5½-27.2	S	Pierce	P	C, Perfex	N	Stromberg	G	M, Bosch	N	M, Hele-Shaw	S, 4	Brown-L, 50-4	N	Spicer	246
247	Lange, B	2,950	Continental	4	4½x5½-27.2		Pierce	T	T, Own		Stromberg		M, Bosch	N	M, Hele-Shaw	I, 3	Own		M & E	247
248	Mack, AB (chain)		Own	4	4x5-25.6	S	Own	P	C, El Arco	N	Zenith	G	M, Dixie	N	M, Brown-L	S, 4	Own	N	Spicer	248
249	Mack, AB (worm)		Own	4	4x5-25.6	S	Own	P	C, El Arco	N	Zenith	G	M, Dixie	N	M, Brown-L	S, 4	Own	N	Spicer	249
250	Menominee, D		Continental, C4	4	4½x5½-27.2	S	Monarch	P	T, Own	N	Stromberg	G	M, Eisemann	N	M, Fuller	S, 4	Fuller, GU	N	Spicer	250
251	Midland, MT	3,000	Buda, HU	4	4½x5½-28.9	F	Duplex	P	T, Chicago		Stromberg		M, Eisemann		M, Fuller	S,	Fuller, JU2			251
252	Muskegon, 20	2,325	Continental	4	4½x5½-27.2		Pierce	P	C, Mayo		Detroit		M, Eisemann	N	M, Fuller	S, 3	Fuller		Arvac	252
253	Mutual, 2A	3,375	Wisconsin, TAU	4	4x6-25.6	F	Duplex	P	C, Perfex	N	Stromberg	G	M, Bosch	Y	M, Hele-Shaw	S, 4	Fuller, G5	N	Spicer	253
254	Nash, 3018	2,395	Own	4	3½x5½-22.5	FS	Simplex	P	T, Long	N	Stromberg	G	M, Eisemann	Y	P, Borg & B	S, 4	Detroit, H36	N	Own	254
255	Nash, 4017 Quad	3,250	Buda, HU	4	4½x5½-28.9	F	Simplex	P	T, Long	N	Stromberg	G	M, Eisemann	N	P, Borg & B	I, 4	Own	N	Own	255
256	National, HA		Waukesha RU4K	4	4½x5½-28.9	S	Waukesha	P	C, McKinnon	Y	Zenith	G	M, Eisemann	N	M, Hele-Shaw	S, 4	Brown-L, 35	N	Spicer	256
257	Netco, D	3,100	Continental, C4	4	4½x5½-27.2	S	N	P	T, R'me-T'r'y	N	Zenith	G	M, Eisemann	N	M, Brown-L	S, 3	Brown-L, 50	N	Hartford	257
258	Niles, E	2,800	Continental, C4	4	4½x5½-27.2	FS	Pierce	P	C, Modine	Y	Stromberg	G	M, Eisemann	N	P, Borg & B	S, 3	Covert, O		Blood	258
259	Noble, C40		Buda	4	4x5½-25.6		Pierce	P	T, Chicago		Stromberg		M, Eisemann		M, Fuller	S, 3	Fuller		M & E	259
260	Northway, B2	3,250	Own	4	4x6-25.6	FS	Pierce	P	C, G & O	Y	Schebler	G	B	Y	M, Fuller	S, 4	Fuller, GU5	N	Spicer	260
261	O. K., 2T	2,850	Budda, OU	4	4½x5½-27.2	FS	Pierce	P	T, Chicago		Zenith		M, Eisemann		M, Fuller	S, 3	Fuller, TU3			261
262	Olympic, A	3,300	Continental, C4	4	4½x5½-27.2	FS	Monarch	P	T, Long		Stromberg	G	M, Bosch		M, Brown-L	S, 4	Brown-L, 50	N	Thermoid	262
263	Oshkosh, A	3,500	Hers'l-Spill, 7000	4	3½x5-19.6	FS	Duplex	T	C, Own	N	Zenith	G	B	Y	M, Brown-L	S, 4	Brown-L, 35	Y	Peters	263
264	Packard, 2E	3,600	Own	4	4x5½-25.6	F	Own	P	T, Fedders	N	Own	G	M, Dixie	N	M, Own	S, 4	Own	N	Thermoid	264
265	Palmer	2,277	Continental, C4	4	4½x5½-27.2	FS	Pierce	P	C, Fedders		Stromberg		M, Bosch		M, Fuller	S, 3	Fuller			265
266	Parker, F9	3,325	Wisconsin, TAU	4	4x6-25.6	F	Monarch	P	T, Own	Y	Stromberg	G	M, Bosch	Y	M, Brown-L	S, 4	Fuller, G	N	Arvac	266
267	Parker, F9W	3,500	Wisconsin, TAU	4	4x6-25.6	F	Monarch	P	T, Bremer	Y	Stromberg	G	M, Bosch	Y	M, Brown-L	S, 4	Fuller, G	N	Arvac	267
268	Pierce-Arrow, X4	4,300	Own	4	4x5½-25.6	F	Own	P	T, Own	N	Own	G	B M, Berling	N	C, Own	S, 4	Own	N	Own	268
269	Pioneer All Steel, F	2,790	Continental	4	4½x5½-27.2		Pierce	P	T, McCord		Stromberg		M, Eisemann	N	M, Brown-L	S, 4	Brown-L		Spicer	269
270	Power, B	2,950	Continental	4	4½x5½-27.2		Pierce	P	C, Candler		Stromberg		M, Simms	N	M, Fuller	S, 4	Fuller		Universal	270
271	Rainier, R8	2,650	Continental, N	4	3½x5-22.5	FS	Monarch	T	C, Harrison	N	Zenith	G	M, Simms	N	M, Brown-L	S, 3	Brown-L, 30	Y	Hartford	271
272	Rowe, CDW	3,000	Wisconsin	4	4x5-25.6		Duplex	P	C, Mayo		Zenith		M, Bosch	N	M, Brown-L	S, 4	Brown-Lipe		Arvac	272
273	Royal	3,200	Wisconsin	4	4x6-25.6		Monarch	P	T, Kells		Stromberg		M, Bosch		P, Borg & B	I, 3	Own	N		273
274	Sandow, I	2,375	Continental, N	4	3½x5-22.5	S	N	P	T, Chicago	Y	Stromberg	G	M, Eisemann	N	M, Brown-L	S, 3	Fuller, TU3		Spicer	274
275	Schacht		Buda, HU	4	4½x5½-28.9	F	Duplex	P	T, Own	N	Schebler	G	M, Bosch	N	C, Own	S, 4	Own	N	M & E	275
276	Shaw, M3	2,700	Continental, C4	4	4½x5½-27.2	FS	Pierce	P	T, Long		Zenith		M, Bosch		M, Brown-L	S, 3	Brown-Lipe			276
277	Southern, 20		Buda, ITU	4	4x5½-25.6	FS	Pierce	T	T, Standard	N	Zenith		M, Bosch	N	P, Borg & B	S, 3	Fuller	N	Spicer	277
278	Standard, 76		Continental, C2	4	4½x5½-27.2	FS	Monarch	P	T, Long	N	Stromberg	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 35	N	Spicer	278
279	Sterling	3,100	Own	4	4x5½-25.6	F	Waukesha	P	C, Own	Y	Rayfield	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 35	N	Spicer	279
280	Stewart, 7	2,875	Continental, C4	4	4½x5½-27.2	FS	Pierce	P	T, Bush	N	Zenith	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU3	N	Hartford	280
281	Stoughton, D			4	4x5½-25.6	F		P	T, Chicago		Stromberg		M, Eisemann		M	S, 3	Brown-Lipe			281
282	Sullivan, E	3,350	Buda, HTU	4	4½x5½-28.9	S	N	P	T, Bush	N	Stromberg	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 35	N	Spicer	282
283	Superior, E	2,450	Continental, C2	4	4½x5½-27.2	F	Pierce	P	C, Ideal	Y	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU3	Y	Arvac	283
284	Traffic, 746	1,395	Continental, N	4	3½x5-22.5	FS	N	T	C, Own	N	Carter	G	M, Bosch	N	M, Covert	S, 3	Covert, MU-T	N	Universal	284
285	Transport, 50	2,785	Continental, C2	4	4½x5½-27.2	FS	Duplex	P	C, Spirex	Y	Stromberg	G	M, Eisemann	N	M, Fuller	S, 4	Fuller, GU	N	Hartford	285

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TRUCK SPECIFICATIONS

4,000 (Available—Transport)

Line no.	Final drive (Bevel, Chain, Internal-gear, Spur-and-bevel, Worm) and make of rear axle and model number.	Hotchkiss drive? (Yes or No)	Differential (Bevel, Spur, Worm) and make.	Number and location of driving-wheels (Front, Rear).	Clearance under front and rear axles.	Service and emergency brakes (Contracting, Expanding).	Frame material (Pressed-steel, Rolled-steel) and make.	Front and rear springs (Cantaliver; 1-2, 3-4, or Full elliptic; Transverse).	Make of springs.	Leaves in front and rear springs.	Length and width of front and rear springs.	Driver's position (Left, Right).	Make of steering gear.	Turning-circle diameter (feet and inches).	Wheels (Iron, Steel, Wood) and make.	Wheel-base (standard).	Front and rear tire sizes (dual, pneumatic).	Weight of chassis (pounds).	Perc. of weight on rear axle when empty & when loaded.	Line no.
213	W, Timken, 6552	N	W	2, R	12, 12	E, E	R, Own	½, ½	Tuthill	9, 11	40x2½-52x3	L	Ross	44, 0	W, Schwarz.	152	36x4-36x7	4,500	55, 75	213
214	I, Clark, 2	N	S	2, R	14, 13	C, E	P, Parish & B.	½, ½	Higgins	8, 13	40x2½-52x3	L	Lavine	48, 0	W, Bimel	144	36x7-40x8	3,800	30, 75	214
215	I, Clark, 2	N	B	2, R	11, 11	C, E	R, Savage	½, ½	Mather	9, 12	40x2½-52½x3	L	Lavine	52, 0	S, Clark	154	36x4-36x7	4,000	50, 80	215
216	W, Timken, 6560	N	W	2, R	11½, 9½	E, E	R, Own	½, ½	Philadelphia	12, 14	44x2½-50x3	L	Ross	40, 0	W, Schwarz.	150	36x4-36x6	4,500	45, 70	216
217	W			2, R		E, E	R									152	36x4-36x7			217
218	W, Wisc., 800C	Y	W	2, R	11, 10	E, E	R, Own	½, ½	Iron City	9, 12	40x2½-52x3	L	Ross	50, 0	W, E & O	138½	36x4-36x4d	4,200	50, 70	218
219	W, Wisconsin			2, R		E, E	P, Savage		Iron City			L	Ross		W, Jones	144½	36x4-36x6			219
220	W, Chicago, C4	Y	B	2, R	10½, 12	E, E	R, Own	½, ½	Maremont	7, 11	41½x2½-48x3	L	Ditweiler	49, 4	W, Crane	148	34x4½p-34x7	3,500	50, 80	220
221	I, Torbensen			2, R		E, E	P, Detroit		Detroit			L	Own		W, Crane	140	35x5p-38x7			221
222	W, Timken			2, R		E, E	P, Parish					L	Ross		W, Schwarz.	134	34x3½-36x5			222
223	I, Russel, 3-201	Y	B	2, R	10, 13	C, E	P	½, ½	Detroit	8, 13	44x2½-52x3	L	Gemmer	57, 1	W, Hayes	144	36x3½-36x6	3,800	50, 75½	223
224	W, Timken	Y	W	2, R		E, E	P	½, ½	Mather	9, 12	40x2½-53x2½	L	Gemmer		W, Prudden	160	36x4-36x7	4,800	50, 90	224
225	W, Timken, 6552	Y	W	2, R	11½, 9½	E, E	P, Smith	½, ½	Rowland	9, 15	42x2½-56x3	L	Ross	60, 0	I, Smith	144	36x4-36x7	5,050	86, 70	225
225a	I, Torbensen			2, R					Own				Ross			128	36x4-36x7	3,900		225a
225b	W, Wisconsin			2, R					Own				Ross			128	36x4-36x7	3,900		225b
226	W, Timken			2, R			P				40x2½-54x3			50, 9		144	34x3½-36x5			226
227	I, Russel, U	Y	B	2, R	10, 12	E, C	R, Own	½, ½	Sheldon			L	Jacox		W	140	36x4-36x6	4,200	85, 80	227
228	W, Timken, 6560	N	B	2, R	12½, 9	E, E	P	½, ½	Mather	9, 13		L	Gemmer		W, Auto	156	36x4-36x7	4,800	60, 71	228
229	W, Sheldon			2, R		E, E	R, Own					L	Ross		I, Smith	144	36x4-36x7			229
230	I, Russel			2, R		C, C	P, Parish & B.	½, ½	Rowland		42x2½-50x2½	L	Lavine	48, 0	W, E & O	137	34x4-34x6			230
231	W, Timken			2, R		E, E	P, Parish		Merrill		40x2½-56x3	L	Gemmer		W, Standard	156	36x4-36x7			231
232	W	Y	B	2, R		E, E	P	½, ½		9, 11	40x2½-54x3	L		57, 0	W	144	36x4-36x7	4,590		232
233	W, Sheldon, W103	Y	B	2, R	12½, 10½	E, E	P, Hydraulic	½, ½	Mather	8, 10	40½x2½-52x2½	R	Ross	51, 0	W, Wayne	168	36x4-36x7	4,500	55, 75	233
234	W, Timken, 6560	N	B	2, R	12½, 9½	E, E	P Smith	½, ½	Detroit	8, 10		L	Jacox		Own	144	36x4-36x7	4,425	53, 74	234
235	W, Standard	Y	B	2, R	11, 10½	E, E	P, Own	½, ½	Perfection	11, 12		L	Ross		W, Bimel	144	36x4-36x7	4,700	72, 91½	235
236	I, Torbensen, C	Y	W	2, R	10, 10½	C, E	P	½, ½	Perfection	11, 12	42x2½-50x2½	L	Jacox	39, 0	W, Royer	124	34x4-34x6	3,600	48½, 67	236
237	W, Timken, 6552	Y	W	2, R	12, 9	E, E	R	½, ½	Perfection	9, 12	40x2½-54x3	L	Gemmer		I, Smith	156	36x4-36x4	4,825	25, 80	237
238	W, Timken			2, R					Tuthill				Ross		W	140	36x4-37x7			238
239	I, Russel			2, R		C, E	R, Own		Garden City			L	Lavine		W, Prudden	146	34x4-34x6			239
240	W, Wisconsin			2, R		E, E	P, Parish & B.		Iron City			L	Wohlrab		S, Indestruct	144	34x4-34x6			240
241	I, Own		B	2, R	10½, 12	E, E	P	½, ½		10, 14	39½x2½-55½x3	L	Ross		W	138	36x4-36x6	4,060	50, 68	241
242	I, Clark, 1D	Y	B	2, R	11, 15½	C, E	P	½, ½	Perfection	9, 11	40x2½-52x2½	L	Jacox	35, 0	W	144½	35x5p-38x7p	3,750	50, 75	242
243	I, Russel			2, R		C, E	R, Own	½, ½	Champion			L	Ross		I, Smith	144	36x4-36x7			243
244	W, Sheldon, W102	Y	B	2, R		E, C	P, Parish	½, ½	U. S	10, 11	40½x2½-47x2½	L	Ross	39, 6	W, Weston		36x6p-36x7		50, 80	244
245	W, Timken, 6560	Y	W	2, R	10½, 10	E, E	P, Smith	½, ½	Mather	10, 11	38x2½-54x3	L	Jacox	50, 0	W, Prudden	168	36x4-36x7	4,910	57½, 76	245
246	W, Timken, 6560	Y	W	2, R	9½, 10	E, E	R, Own	½, ½	Betts	8, 11	44x2½-52x3	R	Ross		W, Waterb'se	153	36x4-37x7	5,300	50, 75	246
247	C, Own			2, R		C, E	R, Own		Standard			L	Gemmer		W, Hoopes	136	36x4-36x6			247
248	C, Own	N	B	2, R	13½, 13½	C, E	P, Own	½, ½	Merrill	8, 11	40x2½-48x3	L	Own	50, 0	W, Own	162		4,900	47, 70	248
249	W, Sheldon	Y	W	2, R	13½, 9½	E, E	P, Own	½, ½	Merrill	8, 11	40x2½-48x3	L	Own	50, 0	W, Own	162		5,000	48, 70	249
250	W, Timken, 6552	N	B	2, R		E, E	R, Own	½, ½	Tuthill	10, 11	43x2½-52x3	L	Ross		W, Standard	160	36x4-36x4d	4,700		250
251	W, Timken, 6552			2, R		E, E	R, Own	½, ½					Ross		I, Smith	144	36x4-36x4d			251
252	I, Torbensen			2, R		C, E	P, Parish & B.	½, ½	Sheldon			L	Lavine		W, Prudden	144	36x4-36x6			252
253	W, Sheldon, W21	N	B	2, R	11, 9½	E, E	P, Parish & B.	½, ½	Mather	8, 10	41x2½-56x3	L	Ross	52, 0	I, Smith	152	36x4-36x8	5,800	40, 71	253
254	I, Clark, 2D	Y	W	2, R	9½, 9½	C, C	P, Own	½, ½	Alloy	10, 12	37½x2½-52x2½	L	Jacox	50, 0	W, Auto	144	34x4-34x6	3,850	51, 73½	254
255	I, Own	Y	W	4, FR	14½, 14½	E, C	P, Own	½, ½	Mather	9, 8	48x2½-48x2½	L	Lavine	50, 0	S	124	36x5-36x5	6,250	33½, 55	255
256	W, Timken, 6560	N	W	2, R	10½, 9	E, E	R	½, ½	Mather	9, 11	40x2½-54x3	L	Ross	26, 0	W, Hayes	141	34x4-34x4d	5,000		256
257	W, Timken, 6560	Y	B	2, R	12, 11	E, E	P	½, ½	Perfection	8, 12	39x2½-49x3	L	Ross		W, Arch'ld	168	36x4-36x6	4,940	57, 65	257
258	W, Timken, 6550	N	W	2, R	11, 9	E, E	P, Savage	½, ½	Iron City	9, 14	45x2½-53x3	L	Gemmer		W, Hoopes	140	36x4-36x7	4,600		258
259	W, Sheldon			2, R		E, E	P, Parish & B.	½, ½	Tuthill			L	Lavine		W, Bimel	148	36x4-36x7			259
260	W, Sheldon, W21	Y	B	2, R	14, 9	E, E	P	½, ½	Perfection	9, 10	42x2½-54x3	L	Ross	50, 0	S, Clark	146	36x4-36x4	5,300	58½, 77½	260
261	W, Wisc., 900			2, R		E, E	P, Savage	½, ½	Tuthill				Ross		W, Bimel	150	36x4-36x7			261
262	W, Timken, 6560	N	B	2, R	10, 10	E, E	P, Savage	½, ½	Mather	7, 12	39x2½-50x3	L	Ross		W, St. M'r'y	158	36x4-36x7	4,600½		262
263	B, Own	Y	B	4, FR	10½, 10½	C, C	P, Smith	½, ½	Tuthill	10, 11	50x2½-54x2½		Ross	52, 0	W, Bimel	146	36x6p-36x6p	4,500		263
264	W, Own	N	S	2, R	9½, 8½	C, E	R, Own	½, ½		11, 11	41x2½-46x2½	L	Own	56, 0	W	144	34x4-34x4d	5,100	48, 70	264
265	W, Own			2, R		E, E	P, Own	½, ½	Tuthill				Ross		W, Bimel	150	34x4-36x4d			265
266	W, Own	N	B	2, R	9½, 10	C, E	P, Smith	½, ½	Tuthill	8 15	48x2½-60x2½	L	Ross	56, 0	W, Bimel	150	34x4-36x7	5,210	51, 71	266
267	W, Own	N	B	2, R	9½, 10	C, E	P, Smith	½, ½	Tuthill	9, 12	48½x2½-60x3	L	Ross	56, 0		150	34x4-36x4	5,210	51, 71	267
268	W, Own	N	W	2, R	13, 9½	C, E	P, Own	½, ½	Spring Perch	10, 13	41x2½-54x3	R	Own	42, 0	W, Own	150	36x4-36x4d	6,250	60, 75	268
269	W, Timken			2, R		E, E	P, Parish					L	Ross		S, Budd	144	36x4-36x7			269
270	W, Timken			2, R		E, E	R, Own		Detroit			L	Ross		W, Hayes	150	36x4-36x4d			270
271	W, Sheldon, W103	Y	B	2, R	9½, 10½	E, E	P, Parish	½, ½	Perfection	9, 12	38x2½-50x2½	L	Ross		W, Schwarz.	147	34x5-34x6	3,450	75, 75	271
272	W, Timken			2, R			R, Own	½, ½	Sheldon			L	Ross		W, Hoopes	142	34x4-36x7			272
273	W, Timken			2, R		E, E	R, Own		Merrill				Ross			132	36x4½-36x6			273
274	I, Torbensen, C2	Y	B	2, R	13, 13½	C, E	P, Savage	¾, ¾	Garden City	8, 12	38½x2½-54x3	L	Ross	60, 0	W, Standard	150	36x4-36x6	4,300	20, 70	274
275	W, Own	N	B	2, R	11, 9	C, E	R, Own	½, ½	National	9, 14	35x2½-50x3	L	Own		W, St. M'rys	144	36x4-36x7	5,500	80, 80	275
276	W, Timken			2, R			P, Smith		Perfection				Gemmer		W	153	36x4-36x6			276
277	W, Sheldon	Y	W	2, R			P, Parish & B.		Mather		38x2½-54x2½	L			W, Royer	157	35x3-35x5			277
278	W, Timken, 6552	N	B	2, R	12, 9½	E, E	R, Own	½, ½		8, 12	38x2½-54x3	L	Ross		W	140	36x4-36x6d			278
279	W, Timken, 6560	N	W	2, R	10½, 9½	E, E	P, W	½c ½o	Mather	8, 11	48x3-54x3	L	Ross	57, 2	W, Prudden	142	36x4-36x6	5,000	55, 97	279
280	I, Clark, 2D	Y	B	2, R	10, 10	C, C	P, Hydraulic	½, ½	Detroit	9, 12	41x2½-54x3	L	Ross	50, 0	W, Wayne	156	34x4-34x7	4,460	59, 72	280
281	W, Sheldon			2, R		E, E	P, Smith	½, ½							W	140½	36x4-36x7			281
282	W, Timken, 6560	Y	B	2, R	10½, 10	E, E	Parish & B	½, ½	Sheldon	9, 11	40x2½-52x3	L	Ross	52, 0	W, Wayne	150	36x4-36x7	4,750	53, 71	282
283	I, Torbensen, CE	Y	B	2, R	13, 13	C, E	P	½, ½	Tuthill	8, 13	38x2½-51x3	L	Ross	46, 0	W, Schwarz.	144	36x4½-36x6	3,600	75, —	283
284	I, Russel, PI-302	Y	B	2, R	11, 12	C, E	R, Own	½, ½	Detroit	9, 10	36½x2-46x2½	L	Own	48, 6	W, Bimel	132	34x3½-34x5	3,175	42, 85	284
285	I, Clark, 2D	Y	B	2, R	10½, 11½	C, E	P	½, ½	Detroit	9, 12	40x2½-54x3	L	Jacox		W	150	36x6p-40x8p	4,250	50, 70	285

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4,000 (Available—Transport) INTERNAL-COMBUSTION

Line no.	Brand name and model name or number	Price f. o. b. factory with seat and tires but without body.	Make of engine and model number.	Number of cylinders.	Bore and stroke, and N. A. C. C. horsepower.	Lubrication (Forced-feed, Splash).	Make of governor (None).	Water-circulation (Pump, Thermo-siphon).	Radiator (Cellular, Tubular) and make.	Radiator guard included in price? (Yes or No)	Make of carbureter.	Fuels (Distillate, Gasolene, Kerosene).	Ignition (Battery, Magneto) and make of magneto.	Electric starting and lighting included in price? (Yes or No)	Clutch (Cone, Multiple-disk, Plate) and make.	Transmission (Individual-clutch, Planetary, Sliding-gear) and number of forward speeds.	Make of transmission and model number.	Power take-off included in price? (Yes or No)	Make of universal joints.	Line no.
	4,000 Pounds—Cont'd.																			
213	Available, H 2	2,950	Continental' C4.	4	4½x5½-27.2	FS	N	P	T, Chicago	Y	Stromberg	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 35	N	Thermoid	213
214	Beck, C	2,350	Continental	4	4½x5½-27.2	F	Pierce	P	C, Ideal	Y	Stromberg	G	M, Bosch	N	M, Fuller	S, 3	Fuller, TU3	Y	Blood	214
215	Belmont, C	2,550	Buda, HU	4	4½x5½-28.9	F	Pierce	P	T, Chicago	Y	Zenith	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU	N	Sterling	215
216	Brinton, F	3,000	Continental, C4.	4	4½x5½-27.2	FS	Pierce	P	T, Mayo	N	Stromberg	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 50		Spicer	216
217	Collier, 20		Continental	4	4½x5½-27.2		Monarch	P			Zenith		M, Eisemann		M, Fuller	S, 4	Fuller			217
218	Conestoga, 30	2,700	Continental, N	4	3½x5-22.5	FS	Duplex	T	T, E & M	N	Stromberg	G	M, Simms	N	M, Fuller	S, 3	Fuller, TU3	N	Sterling	218
219	Day-Elder, D	2,450	Continental	4	4½x5½-27.2		Monarch	P	T, Bush		Zenith		M, Berling		M, Fuller	S, 3	Covert		Hartford	219
220	Dearborn, BW	2,390	Buda	4	3½x5½-22.5	F	Simplex	P	T, Chicago	Y	Stromberg	G	M, Bosch	N	M, Fuller	S, 3	Fuller	N	Hartford	220
221	Defiance, E		Continental	4	3½x5-22.5		N	P	C, Perfex		Stromberg			Y	P, Borg & B	S, 3	Grant-Lees			221
222	DeKalb, E2	2,250	Continental	4	4½x5½-27.2		N	P	T, Jackson		Master		M, Eisemann		M, Fuller	S, 3	Fuller		Hartford	222
223	Denby, 134	2,450	Continental, N	4	3½x5-22.5	F	Monarch	T	T, Long	Y	Stromberg	G	M, Eisemann	N	M, Fuller	S, 4	Fuller, GU	N	Universal	223
224	Diamond T, U	3,285		4	4x5½-25.6	F		P	T, G & O	N	Stromberg	G	M, Bosch	N	M	S, 4		N	Spicer	224
225	Dorris, K4	3,400	Own	4	4½x5½-28.9	F	Own	P	T, McCord	Y	Stromberg	G	M, Bosch	N	M, Warner	S, 4	Warner, T53	N	Spicer	225
225a	Douglas, H (int.)	2,650	Buda	4	4½x5½-27.2	F	Pierce	P	Own		Schebler		M, Eisemann		M, Fuller	S, 3	Fuller		Arvac	225a
225b	Douglas, H (worm)	2,850	Buda	4	4½x5½-27.2	F	Pierce	P	Own		Schebler		M, Eisemann		M, Fuller	S, 3	Fuller		Arvac	225b
226	Erie			4	4½x5½-27.2		Pierce		T		Stromberg		M, Bosch		M	S, 4				226
227	Fargo, P	2,250	Continental, N	4	3½x5-22.5	FS	Monarch	T	T, Own	N	Rayfield	G	M, Bosch	N	M, Fuller	S, 4	Fuller, GU	N	Spicer	227
228	Federal, UE	2,900	Continental, C4.	4	4½x5½-27.2	FS	Pharo	P	T, McCord	Y	Zenith	G	M, Eisemann	N	P, Borg & B	S, 4	Detroit, TUE	N	Spicer	228
229	Forschler, B	2,750	Continental	4	4½x5½-27.2		Duplex	P	T, Own		Zenith		M, Bosch		M, Fuller	S, 3	Fuller		Own	229
230	Fulton, C	2,350	Herschell-Spill	4	3½x5-16.9		Pierce	T	T, G & O		Carter		M, Simms	N	P, Borg & B	S, 3	Durston		Universal	230
231	Gabriel, E	3,250	Buda	4	4½x5½-28.9		Duplex	P	C, G & O		Rayfield		M, Bosch	N	P, Borg & B	S, 4	Brown-Lipe		Spicer	231
232	Garford, 70H	3,190		4	4½x5½-28.9	F	Simplex	P	T, Own	N	Rayfield	G	M, Splitdorf	N	M	S, 4		N		232
233	Giant, 16	3,050	Continental, C4.	4	4½x5½-27.2	FS	Pierce	P	C, Own	Y	Schebler	G,K	M, Eisemann	N	M, Brown-L	S, 3	Brown-L, 35	N	Spicer	233
234	GMC, 41A	2,950	Continental, C2.	4	4½x5½-27.2	FS	Monarch	P	T, Own	N	Marvel	G	M, Eisemann	N	M, Own	S, 4	Own	N	Own	234
235	Gramm-Bernstein, 20	2,900	Continental, C2.	4	4½x5½-27.2	FS	Pierce	P	T, Own	Y	Stromberg	G	B, North East	N	M, Fuller	I, 4	Own	N	Own	235
236	Grant, 15		Continental, N	4	3½x5-22.5	S	Pierce	T	C, Fedders	N	Carter	G	M, Splitdorf	Y	P, Borg& B	S, 3	Grant-Lees, 515	N	Arvac	236
237	Hall	2,875	Continental, C4.	4	4½x5½-27.2	FS	Simplex	P	T, Long	Y	Zenith	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 35	N	Spicer	237
238	Hendrickson	3,000	Buda, BU4R	4	4½x5½-28.9	S		P	T, Chicago		Stromberg		M, Dixie		M, Fuller	S, 4	Fuller			238
239	Independent (Iowa), F	2,290	Continental	4	4½x5½-27.2		N	P	C, Chicago				M, Bosch	N	M, Fuller	S, 3	Fuller		Blood	239
240	Independent (Ohio), G	2,300	Continental	4	4½x5½-27.2		Monarch	P	T, Long		Zenith		M, Eisemann		M, Fuller	S, 3	Fuller		Sterling	240
241	International, G	2,700	Own	4	4x5-25.6	FS	Own	T	T, Own	Y	Ensign	G	M, Dixie	N	M, Own	S, 3	Own	Y	Own	241
242	Jumbo, 20		Buda, CTU	4	3½x5½-22 5	F	N	T	T, Own	Y	Zenith	G	B, Northeast	Y	M, Fuller	S, 3	Fuller, LTU8	Y	Arvac	242
243	Keldon, 19	2,885	Buda	4	4½x5½-28.9		Waukesha	P	C, Eureka		Stromberg		M, Eisemann		P, Borg & B	S, 3	Covert		Acme	243
244	Kimball, B	3,675	Wisconsin, TU	4	4x6-25.6	FS	Duplex	P	C, Flexo	N	Zenith	D	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 35	N	Spicer	244
245	Kissel, Freighter	2,875	Own	4	4½x5½-28.9	S	Pierce	P	T, Fedders	N	Stromberg	G	M, Eisemann	N	M, Warner	S, 4	Warner, T53	N	Spicer	245
246	Kleiber, BB	3,200	Continental, C4.	4	4½x5½-27.2	S	Pierce	P	C, Perfex	N	Stromberg	G	M, Bosch	N	M, Hele-Shaw	S, 4	Brown-L, 50-4	N	Spicer	246
247	Lange, B	2,950	Continental	4	4½x5½-27.2		Pierce	T	T, Own		Stromberg		M, Bosch	N	M, Hele-Shaw	I, 3	Own		M & E	247
248	Mack, AB (chain)		Own	4	4x5-25.6	S	Own	P	C, El Arco	N	Zenith	G	M, Dixie	N	M, Brown-L	S, 4	Own	N	Spicer	248
249	Mack, AB (worm)		Own	4	4x5-25.6	S	Own	P	C, El Arco	N	Zenith	G	M, Dixie	N	M, Brown-L	S, 4	Own	N	Spicer	249
250	Menominee, D		Continental, C4	4	4½x5½-27.2	S	Monarch	P	T, Own	N	Stromberg	G	M, Eisemann	N	M, Fuller	S, 4	Fuller, GU	N	Spicer	250
251	Midland, MT	3,000	Buda, HU	4	4½x5½-28.9	F	Duplex	P	T, Chicago		Stromberg		M, Eisemann		M, Fuller	S,	Fuller, JU2			251
252	Muskegon, 20	2,325	Continental	4	4½x5½-27.2		Pierce	P	C, Mayo		Detroit		M, Eisemann	N	M, Fuller	S, 3	Fuller		Arvac	252
253	Mutual, 2A	3,375	Wisconsin, TAU	4	4x6-25.6	F	Duplex	P	C, Perfex	N	Stromberg	G	M, Bosch	Y	M, Hele-Shaw	S, 4	Fuller, G5	N	Spicer	253
254	Nash, 3018	2,295	Own	4	3½x5½-22.5	FS	Simplex	P	T, Long	N	Stromberg	G	M, Eisemann	Y	P, Borg & B	S, 4	Detroit, H26	N	Own	254
255	Nash, 4017 Quad	3,250	Buda, HU	4	4½x5½-28.9	F	Simplex	P	T, Long	N	Stromberg	G	M, Eisemann	N	P, Borg & B	I, 4	Own	N	Own	255
256	National, HA		Waukesha RU4K	4	4½x5½-28.9	S	Waukesha	P	C, McKinnon	Y	Zenith	G	M, Eisemann	N	M, Hele-Shaw	S, 4	Brown-L, 35	N	Spicer	256
257	Netco, D	3,100	Continental, C4.	4	4½x5½-27.2	S	N	T	T, R'me-T'r'y	N	Zenith	G	M, Eisemann	N	M, Brown-L	S, 3	Brown-L, 50	N	Hartford	257
258	Niles, E	2,800	Continental, C4	4	4½x5½-27.2	FS	Pierce	P	C, Modine	Y	Stromberg	G	M, Eisemann	N	P, Borg & B	S, 3	Covert, O		Blood	258
259	Noble, C40		Buda	4	4x5½-25.6		Pierce	P	T, Chicago		Stromberg		M, Eisemann		M, Fuller	S, 3	Fuller		M & E	259
260	Northway, B2	3,250	Own	4	4x6-25.6	FS	Pierce	P	C, G & O	Y	Schebler	G	B	Y	M, Fuller	S, 4	Fuller, GU5	N	Spicer	260
261	O. K., 2T	2,850	Budda, OU	4	4½x5½-27.2	FS	Pierce	P	T, Chicago		Zenith		M, Eisemann		M, Fuller	S, 3	Fuller, TU3			261
262	Olympic, A	3,300	Continental, C4.	4	4½x5½-27.2	FS	Monarch	P	T, Long		Stromberg	G	M, Bosch		M, Brown-L	S, 4	Brown-L, 50	N	Thermoid	262
263	Oshkosh, A	3,500	Hers'l-Spill. 7000	4	3½x5-19.6	FS	Duplex	P	C, Own	N	Zenith	G	B	Y	M, Brown-L	S, 4	Brown-L, 35	Y	Peters	263
264	Packard, 2E	3,600	Own	4	4x5½-25.6	F	Own	P	T, Fedders	N	Own	G	M, Dixie	N	M, Own	S, 4	Own	N	Thermoid	264
265	Palmer	2,277	Continental, C4.	4	4½x5½-27.2	FS	Pierce	P	C, Fedders		Stromberg		M, Bosch		M, Fuller	S, 3	Fuller			265
266	Parker, F9	3,325	Wisconsin, TAU.	4	4x6-25.6	F	Monarch	P	T, Own	Y	Stromberg	G	M, Bosch	Y	M, Brown-L	S, 4	Fuller, G	N	Arvac	266
267	Parker, F9W	3,500	Wisconsin, TAU.	4	4x6-25.6	F	Monarch	P	T, Bremer	Y	Stromberg	G	M, Bosch	Y	M, Brown-L	S, 4	Fuller, G	N	Arvac	267
268	Pierce-Arrow, X4	4,300	Own	4	4x5½-25.6	F	Own	P	T, Own	N	Own	G	B M, Berling	N	C, Own	S, 4	Own	N	Own	268
269	Pioneer All Steel, F	2,790	Continental	4	4½x5½-27.2		Pierce	P	T, McCord		Stromberg		M, Eisemann	N	M, Brown-L	S, 4	Brown-L		Spicer	269
270	Power, B	2,950	Continental	4	4½x5½-27.2		Pierce	P	C, Candler		Stromberg		M, Simms	N	M, Fuller	S, 4	Fuller		Universal	270
271	Rainier, R8	2,650	Continental, N	4	3½x5-22.5	FS	Monarch	T	C, Harrison	N	Zenith	G	M, Simms	N	M, Brown-L	S, 3	Brown-L, 30	Y	Hartford	271
272	Rowe, CDW	3,000	Wisconsin	4	4x5-25.6		Duplex	P	C, Mayo		Zenith		M, Bosch	N	M, Brown-L	S, 4	Brown-Lipe		Arvac	272
273	Royal	3,200	Wisconsin	4	4x6-25.6		Monarch	P	T, Kells		Stromberg		M, Bosch		P, Borg & B	I, 3	Own	N		273
274	Sandow, I	2,375	Continental, N	4	3½x5-22.5	S	N	P	T, Chicago	Y	Stromberg	G	M, Eisemann	N	M, Brown-L	S, 3	Fuller, TU½		Spicer	274
275	Schacht		Buda, HU	4	4½x5½-28.9	F	Duplex	P	T, Own	N	Schebler	G	M, Bosch	N	C, Own	S, 4	Own	N	M & E	275
276	Shaw, M3	2,700	Continental, C4.	4	4½x5½-27.2	FS	Pierce	P	T, Long		Zenith		M, Bosch		M, Brown-L	S, 3	Brown-Lipe			276
277	Southern, 20		Buda, ITU	4	4x5½-25.6	FS	Pierce	T	T, Standard	N	Zenith	G	M, Bosch	N	P, Borg & B	S, 3	Fuller	N	Spicer	277
278	Standard, 76		Continental, C2	4	4½x5½-27.2	FS	Monarch	P	T, Long	N	Stromberg	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 35	N	Spicer	278
279	Sterling	3,100	Own	4	4x5½-25.6	F	Waukesha	P	C, Own	Y	Rayfield	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 35	N	Spicer	279
280	Stewart, 7	2,875	Continental, C4.	4	4½x5½-27.2	FS	Pierce	P	T, Bush	N	Zenith	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU3	N	Hartford	280
281	Stoughton, D			4	4x5½-25.6	F		P	T, Chicago		Stromberg		M, Eisemann		M	S, 3	Brown-Lipe			281
282	Sullivan, E	3,350	Buda, HTU	4	4½x5½-28.9	S	N	P	T, Bush	N	Stromberg	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 35	N	Spicer	282
283	Superior, E	2,450	Continental, C2	4	4½x5½-27.2	F	Pierce	P	C, Ideal	Y	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU3	Y	Arvac	283
284	Traffic, 746	1,395	Continental, N	4	3½x5-22.5	FS	N	T	C, Own	N	Carter	G	M, Bosch	N	M, Covert	S, 3	Covert, MU-T	N	Universal	284
285	Transport, 50	2,785	Continental, C2	4	4½x5½-27.2	FS	Duplex	P	C, Spirex	Y	Stromberg	G	M, Eisemann	N	M, Fuller	S, 4	Fuller, GU	N	Hartford	285

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TRUCK SPECIFICATIONS

4,000 (Available—Transport)

Line no.	Final drive (Bevel, Chain, Internal-gear, Spur-and-bevel, Worm) and make of rear axle and model number.	Hotchkiss drive? (Yes or No)	Differential (Bevel, Spur, Worm) and make.	Number and location of driving-wheels (Front, Rear).	Clearance under front and rear axles.	Service and emergency brakes (Contracting, Expanding).	Frame material (Pressed-steel, Rolled-steel) and make.	Front and rear springs (Cantaliver; 1-2, 3-4, or Full elliptic; Transverse).	Make of springs.	Leaves in front and rear springs.	Length and width of of front and rear springs.	Driver's position (Left, Right).	Make of steering gear.	Turning-circle diameter (feet and inches).	Wheels (Iron, Steel, Wood) and make.	Wheel-base (standard).	Front and rear tire sizes (dual, pneumatic).	Weight of chassis (pounds).	Perc. of weight on rear axle when empty & when loaded.	Line no.
213	W, Timken, 6552..	N	W	2, R	12, 12	E, E	R, Own.....	½, ½	Tuthill.....	9, 11	40x2½-52x3....	L	Ross.....	44, 0	W, Schwarz.	152	36x4-36x7.....	4,500	55, 75	213
214	I, Clark, 2.....	N	S	2, R	14, 13	C, E	P, Parish & B..	½, ½	Higgins.....	8, 13	40x2½-52x3....	L	Lavine...	48, 0	W, Bimel...	144	36x7-40x8.....	3,800	30, 75	214
215	I, Clark, 2.....	N	B	2, R	11, 11	C, E	R, Savage.....	½, ½	Mather.....	9, 12	40x2½-52½x3...	L	Lavine...	52, 0	S, Clark....	154	36x4-36x7.....	4,000	50, 80	215
216	W, Timken, 6560..	N	W	2, R	11½, 9½	E, E	R, Own.....	½, ½	Philadelphia	12, 14	44x2½-50x3....	L	Ross.....	40, 0	W, Schwarz.	150	36x4-36x6.....	4,500	45, 70	216
217	W.....	....	.....	2, R	.....	E, E	R.....	.....	.....	.....	.....	...	.....	.....	.....	152	36x4-36x7.....	.....	.....	217
218	W, Wisc., 800C...	Y	W	2, R	11, 10	E, E	R, Own.....	½, ½	Iron City...	9, 12	40x2½-52x3....	L	Ross.....	50, 0	W, E & O...	138½	36x4-36x4d.....	4,200	50, 70	218
219	W, Wisconsin.....	....	.....	2, R	.....	E, E	P, Savage.....	.....	Iron City...	.....	.....	L	Ross.....	.....	W, Jones...	144½	36x4-36x6.....	.....	.....	219
220	W, Chicago, C4...	Y	B	2, R	10½, 12	E, E	R, Own.....	½, ½	Maremont..	7, 11	41½x2½-48x3...	L	Ditweiler.	49, 4	W, Crane...	148	34x4½p-34x7.....	3,500	50, 80	220
221	I, Torbensen.....	....	.....	2, R	.....	E, E	P, Detroit.....	.....	Detroit.....	.....	.....	L	Own.....	.....	W, Crane...	140	35x5p-38x7.....	.....	.....	221
222	W, Timken.....	....	.....	2, R	.....	E, E	P, Parish.....	.....	.....	.....	.....	L	Ross.....	.....	W, Schwarz.	134	34x3½-36x5.....	.....	.....	222
223	I, Russel, 3-201...	Y	B	2, R	10, 13	C, E	P.....	½, ½	Detroit.....	8, 13	44x2½-52x3....	L	Gemmer..	57, 1	W, Hayes...	144	36x3½-36x6.....	3,800	50, 75½	223
224	W, Timken.....	Y	W	2, R	.....	E, E	P.....	½, ½	Mather.....	9, 12	40x2½-53x2½...	L	Gemmer..	.....	W, Prudden.	160	36x4-36x7.....	4,800	50, 90	224
225	W, Timken, 6552..	Y	W	2, R	11½, 9½	E, E	P, Smith.....	½, ½	Rowland...	9, 15	42x2½-56x3....	L	Ross.....	60, 0	I, Smith....	144	36x4-36x7.....	5,050	86, 70	225
225a	I, Torbensen.....	....	.....	2, R	.....	.....	.....	.....	Own.....	.....	.....	...	Ross.....	.....	.....	128	36x4-36x7.....	3,900	.....	225a
225b	W, Wisconsin	....	.....	2, R	.....	.....	.....	.....	Own.....	.....	.....	...	Ross.....	.....	.....	128	36x4-36x7.....	3,900	.....	225b
226	W, Timken.....	....	.....	2, R	.....	.....	P.....	.....	.....	.....	40x2½-54x3....	...	.....	50, 9	.....	144	34x3½-36x5.....	.....	.....	226
227	I, Russel, U.....	Y	B	2, R	10, 12	E, C	R, Own.....	½, ½	Sheldon.....	.....	.....	L	Jacox.....	.....	W.....	140	36x4-36x6.....	4,200	85, 80	227
228	W, Timken, 6560..	N	B	2, R	12½, 9	E, E	P.....	½, ½	Mather.....	9, 13	.....	L	Gemmer..	.....	W, Auto...	156	36x4-36x7.....	4,800	60, 71	228
229	W, Sheldon.....	....	.....	2, R	.....	E, E	R, Own.....	.....	.....	.....	.....	L	Ross.....	.....	I, Smith....	144	36x4-36x7.....	.....	.....	229
230	I, Russel.....	....	.....	2, R	.....	C, C	P, Parish & B..	½, ½	Rowland ...	.....	42x2½-50x2½...	L	Lavine...	48, 0	W, E & O...	137	34x4-34x6.....	.....	.....	230
231	W, Timken.....	....	.....	2, R	.....	E, E	P, Parish.....	.....	Merrill.....	.....	40x2½-56x3....	L	Gemmer..	.....	W, Standard	156	36x4-36x7.....	.....	.....	231
232	W.....	Y	B	2, R	.....	E, E	P.....	½, ½	.....	9, 11	40x2½-54x3....	L	.....	57, 0	W.....	144	36x4-36x7.....	4,590	.....	232
233	W, Sheldon, W103.	Y	B	2, R	12½, 10½	E, E	P, Hydraulic...	½, ½	Mather.....	8, 10	40½x2½-52x2½..	R	Ross.....	51, 0	W, Wayne..	168	36x4-36x6.....	4,500	55, 75	233
234	W, Timken, 6560..	N	B	2, R	12½, 9½	E, E	P Smith.....	½, ½	Detroit.....	8, 10	.....	L	Jacox.....	.....	Own.....	144	36x4-36x7.....	4,425	53, 74	234
235	W, Standard....	Y	B	2, R	11, 10¾	E, E	P, Own.....	½, ½	Perfection..	11, 12	.....	L	Ross.....	.....	W, Bimel...	144	36x4-36x7.....	4,700	72, 91½	235
236	I, Torbensen, C...	Y	W	2, R	10, 10½	C, E	P.....	½, ½	Perfection..	11, 12	42x2½-50x2½...	L	Jacox....	39, 0	W, Royer...	124	34x4-34x6.....	3,600	48½, 67	236
237	W, Timken, 6552..	Y	W	2, R	12, 9	E, E	R.....	½, ½	Perfection..	9, 12	40x2½-54x3....	L	Gemmer..	.....	I, Smith....	156	36x4-36x4.....	4,825	25, 80	237
238	W, Timken.....	....	.....	2, R	.....	.....	.....	.....	Tuthill.....	.....	.....	...	Ross.....	.....	W.....	140	36x4-37x7.....	.....	.....	238
239	I, Russel.....	....	.....	2, R	.....	C, E	R, Own.....	.....	Garden City	.....	.....	L	Lavine...	.....	W, Prudden.	146	34x4-34x6.....	.....	.....	239
240	W, Wisconsin.....	....	.....	2, R	.....	E, E	P, Parish & B..	.....	Iron City..	.....	.....	L	Wohlrab..	.....	S, Indestruct	144	34x4-34x6.....	.....	.....	240
241	I, Own.....	....	B	2, R	10½, 12	E, E	P.....	½, ½	.....	10, 14	39½x2½-55½x3..	L	Ross.....	.....	W.....	138	36x4-36x6.....	4,060	50, 68	241
242	I, Clark, 1D.....	Y	B	2, R	11, 15¼	C, E	P, Perfection..	½, ½	Perfection..	9, 11	40x2½-52x2½...	L	Jacox....	35, 0	W.....	144½	35x5p-38x7p.....	3,750	50, 75	242
243	I, Russel.....	....	.....	2, R	.....	C, E	R, Own.....	½, ½	Champion....	.....	.....	L	Ross.....	.....	I, Smith....	144	34x4-36x7.....	.....	.....	243
244	W, Sheldon, W102.	Y	B	2, R	.....	E, C	P, Parish.....	½, ½	U. S.....	10, 11	40½x2½-47x2½..	L	Ross.....	39, 6	W, Weston..	.....	36x6p-36x7.....	.....	50, 80	244
245	W, Timken, 6560..	Y	W	2, R	10½, 10	E, E	P, Smith.....	½, ½	Mather.....	10, 11	38x2½-54x3....	L	Jacox....	50, 0	W, Prudden.	168	36x4-36x7.....	4,910	57½, 76	245
246	W, Timken, 6560..	Y	W	2, R	9½, 10	E, E	R, Own.....	½, ½	Betts.....	8, 11	44x2½-52x3....	R	Ross.....	.....	W, Waterb'se	153	36x4-37x7.....	5,300	50, 75	246
247	C, Own.....	....	.....	2, R	.....	C, E	R, Own.....	.....	Standard....	.....	.....	L	Gemmer..	.....	W, Hoopes..	136	36x4-36x6.....	.....	.....	247
248	C, Own.....	N	B	2, R	13½, 13½	C, E	P, Own.....	½, ½	Merrill.....	8, 11	40x2½-48x3....	L	Own.....	50, 0	W, Own....	162	.....	4,900	47, 70	248
249	W, Sheldon.....	Y	W	2, R	13½, 9½	E, E	P, Own.....	½, ½	Merrill.....	8, 11	40x2½-48x3....	L	Own.....	50, 0	W, Own....	162	.....	5,000	48, 70	249
250	W, Timken, 6552..	N	B	2, R	.....	E, E	R, Own.....	½, ½	Tuthill.....	10, 11	43x2½-52x3....	L	Ross.....	.....	W, Standard	160	36x4-36x4d.....	4,700	.....	250
251	W, Timken, 6552..	....	.....	2, R	.....	E, E	R, Own.....	½, ½	.....	.....	.....	...	Ross.....	.....	I, Smith....	144	36x4-36x4d.....	.....	.....	251
252	I, Torbensen.....	....	.....	2, R	.....	C, E	P, Parish & B..	½, ½	Sheldon.....	.....	.....	L	Lavine...	.....	W, Prudden.	144	36x4-36x6.....	.....	.....	252
253	W, Sheldon, W21..	N	B	2, R	11, 9¼	E, E	P, Parish & B..	½, ½	Mather.....	8, 10	41x2½-56x3....	L	Ross.....	52, 0	I, Smith....	152	36x4-36x8.....	5,800	40, 71	253
254	I, Clark, 2D.....	Y	W	2, R	9½, 9½	C, C	P, Own.....	½, ½	Alloy.....	10, 12	37½x2½-52x2½...	L	Jacox....	50, 0	W, Auto....	144	34x4-34x6.....	3,850	51, 73½	254
255	I, Own.....	Y	W	4, FR	14¼, 14¼	E, C	P, Own.....	½, ½	Mather.....	9, 8	48x2½-48x2½...	L	Lavine...	50, 0	S.....	124	36x5-36x5.....	6,250	33½, 55	255
256	W, Timken, 6560..	N	W	2, R	10½, 9	E, E	R.....	½, ½	Mather.....	9, 11	40x2½-54x3....	L	Ross.....	26, 0	W, Hayes..	141	34x4-34x4d.....	5,000	.....	256
257	W, Timken, 6560..	Y	B	2, R	12, 11	E, E	P.....	½, ½	Perfection..	8, 12	39x2½-49x3....	L	Ross.....	.....	W, Arch'ld..	168	36x4-36x6.....	4,940	57, 65	257
258	W, Timken, 6550..	N	W	2, R	11, 9	E, E	P, Savage.....	½, ½	Iron City...	9, 14	45x2½-53x3....	L	Gemmer..	.....	W, Hoopes..	140	36x4-36x7.....	4,600	.....	258
259	W, Sheldon.....	....	.....	2, R	.....	E, E	P, Parish & B..	½, ½	Tuthill.....	.....	.....	L	Lavine...	.....	W, Bimel...	148	36x4-36x7.....	.....	.....	259
260	W, Sheldon, W21..	Y	B	2, R	14, 9	E, E	P.....	½, ½	Perfection..	9, 10	42x2½-54x3....	L	Ross.....	50, 0	S, Clark....	146	36x4-36x4.....	5,300	58½, 77½	260
261	W, Wisc., 900....	....	.....	2, R	.....	E, E	P, Savage.....	½, ½	Tuthill.....	.....	.....	...	Ross.....	.....	W, Bimel...	150	36x4-36x7.....	.....	.....	261
262	W, Timken, 6560..	N	B	2, R	10, 10	E, E	P, Savage.....	½, ½	Mather.....	7, 12	39x2½-50x3....	L	Ross.....	.....	W, St. M'r'y.	158	36x4-36x7.....	4,600½	.....	262
263	B, Own.....	Y	B	4, FR	10½, 10½	C, C	P, Smith.....	½, ½	Tuthill.....	10, 11	50x2½-54x2½...	...	Ross.....	52, 0	W, Bimel...	146	36x6p-36x6p.....	4,500	.....	263
264	W, Own.....	N	S	2, R	9¼, 8¾	C, E	R, Own.....	½, ½	.....	11, 11	41x2½-46x2½...	L	Own.....	56, 0	W.....	144	34x4-34x4d.....	5,100	48, 70	264
265	W, Own.....	....	.....	2, R	.....	E, E	P, Own.....	½, ½	Tuthill.....	.....	.....	...	Ross.....	.....	W, Bimel...	150	34x4-36x4d.....	.....	.....	265
266	W, Own.....	N	B	2, R	9½, 10	C, E	P, Smith.....	½, ½	Tuthill.....	8 15	48x2½-60x2½...	L	Ross.....	56, 0	W, Bimel...	150	34x4-36x7.....	5,210	51, 71	266
267	W, Own, ...	N	B	2, R	9½, 10	C, E	P, Smith.....	½, ½	Tuthill.....	9, 12	48½x2½-60x3...	L	Ross.....	56, 0	.....	150	34x4-36x4.....	5,210	51, 71	267
268	W, Own.....	N	W	2, R	13, 9½	C, E	P, Own.....	½, ½	Spring Perch	10, 13	41x2½-54x3....	R	Own.....	42, 0	W, Own....	150	36x4-36x4d.....	6,250	60, 75	268
269	W, Timken.....	....	.....	2, R	.....	E, E	P, Parish.....	.....	.....	.....	.....	L	Ross.....	.....	S, Budd....	144	36x4-36x7.....	.....	.....	269
270	W, Timken.....	....	.....	2, R	.....	E, E	R, Own.....	.....	Detroit.....	.....	.....	L	Ross.....	.....	W, Hayes..	150	36x4-36x4d.....	.....	.....	270
271	W, Sheldon, W103.	Y	B	2, R	9½, 10½	E, E	P, Parish.....	½, ½	Perfection..	9, 12	38x2½-50x2½...	L	Ross.....	.....	W, Schwarz.	147	34x5-34x6.....	3,450	75, 75	271
272	W, Timken.....	....	.....	2, R	.....	.....	R, Own.....	½, ½	Sheldon.....	.....	.....	L	Ross.....	.....	W, Hoopes..	142	34x4-36x7.....	.....	.....	272
273	W, Timken.....	....	.....	2, R	.....	E, E	R, Own.....	.....	Merrill.....	.....	.....	...	Ross.....	.....	.....	132	36x4½-36x6.....	.....	.....	273
274	I, Torbensen, C2..	Y	B	2, R	13, 13½	C, E	P, Savage.....	¾, ¾	Garden City	8, 12	38½x2½-54x3....	L	Ross.....	60, 0	W, Standard	150	36x4-36x6.....	4,300	20, 70	274
275	W, Own.....	N	B	2, R	11, 9	C, E	R, Own.....	½, ½	National...	9, 14	35x2½-50x3....	L	Own.....	.....	W, St. M'rys.	144	36x4-36x7.....	5,500	80, 80	275
276	W, Timken.....	....	.....	2, R	.....	.....	P, Smith.....	.....	Perfection..	.....	.....	...	Gemmer..	.....	W.....	153	36x4-36x6.....	.....	.....	276
277	W, Sheldon.....	Y	W	2, R	.....	.....	P, Parish & B..	.....	Mather.....	.....	38x2½-54x2½...	L	.....	.....	W, Royer...	157	35x3-35x5.....	.....	.....	277
278	W, Timken, 6552..	N	B	2, R	12, 9½	E, E	R, Own.....	½, ½	.....	8, 12	38x2½-54x3....	L	Ross.....	.....	W.....	140	36x4-36x6d.....	.....	.....	278
279	W, Timken, 6560..	N	W	2, R	10¾, 9¾	E, E	P, W.....	⅛c ⅛c	Mather.....	8, 11	48x3-54x3....	L	Ross.....	57, 2	W, Prudden.	142	36x4-36x6.....	5,000	55, 97	279
280	I, Clark, 2D.....	Y	B	2, R	10, 10	C, C	P, Hydraulic...	½, ½	Detroit.....	9, 12	41x2½-54x3....	L	Ross.....	50, 0	W, Wayne..	156	34x4-34x7.....	4,460	59, 72	280
281	W, Sheldon.....	....	.....	2, R	.....	E, E	P, Smith.....	½, ½	.....	.....	.....	...	.....	.....	W.....	140½	36x4-36x7.....	.....	.....	281
282	W, Timken, 6560..	Y	B	2, R	10¾, 10	E, E	Parish & B....	½, ½	Sheldon.....	9, 11	40x2½-52x3....	L	Ross.....	52, 0	W, Wayne..	150	36x4-36x7.....	4,750	53, 71	282
283	I, Torbensen, CE..	Y	B	2, R	13, 13	C, E	P.....	½, ½	Tuthill.....	8, 13	38x2½-51x3....	L	Ross.....	46, 0	W, Schwarz.	144	36x4½-36x6.....	3,600	75, —	283
284	I, Russel, PI-302..	Y	B	2, R	11, 12	C, E	R, Own.....	½, ½	Detroit.....	9, 10	36½x2-46x2½...	L	Own.....	48, 6	W, Bimel...	132	34x3½-34x5.....	3,175	42, 85	284
285	I, Clark, 2D.....	Y	B	2, R	10¾, 11½	C, E	P.....	½, ½	Detroit.....	9, 12	40x2½-54x3....	L	Jacox.....	.....	W.....	150	36x6p-40x8p.....	4,250	50, 70	285

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4,000 (Triangle)—5,000 (Sandow) INTERNAL-COMBUSTION

Line no.	Brand name and model name or number	Price f. o. b. factory with seat and tires but without body.	Make of engine and model number.	Number of cylinders.	Bore and stroke, and N. A. C. C. horse-power.	Lubrication (Forced-feed, Splash).	Make of governor (None).	Water-circulation (Pump, Thermo-siphon).	Radiator (Cellular, Tubular) and make.	Radiator guard included in price? (Yes or No)	Make of carbureter.	Fuels (Distillate, Gasolene, Kerosene).	Ignition (Battery, Magneto) and make of magneto.	Electric starting and lighting included in price? (Yes or No)	Clutch (Cone, Multiple-disk, Plate) and make.	Transmission (Individual-clutch, Planetary, Sliding-gear) and number of forward speeds.	Make of transmission and model number.	Power take-off included in price? (Yes or No)	Make of universal joints.	Line no.
	4,000 Pounds—Cont'd																			
286	Triangle, C	2,585	Waukesha, BU4	4	3¾x5½-22.5	S	Waukesha	P	T, Perfex	N	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU3	N	Detroit	286
287	Triumph, H	2,350	Buda, CTU	4	3¾x5½-22.5	F	Pierce	P	C, Modine	Y	Bennett	G	M, Dixie	N	P, Borg & B	I, 3	Cotta, AAU	N	Hartford	287
288	Universal, D		Own	4	4¼x5½-28.9		Monarch	P	T, Long		Zenith		M, Eisemann		M, Own	S, 3	Own			288
289	Victor (Mich.), B		Continental, N	4	3¾x5-22.5	F	N	T	C, Modine		Stromberg		M, Eisemann		M, Fuller	S, 3	Fuller, LTU	Y	Acme	289
290	Vim, 22	3,150	Hercules	4	3¾x5½-22.5	F	Duplex	P	T, McCord	N	Zenith	G	M, Dixie	N	M, Brown-L	S, 4	Brown-L, 35	N	Spicer	290
291	White, 20	3,300	Own	4	3¾x5½-22.5	FS	N	P	C	N	Own	G	M		P, Own	S, 4	Own	N	Own	291
292	Wichita, M	2,750	Waukesha	4	3¾x5½-22.5		Waukesha	P	T, Perfex		Stromberg		M, Bosch		C	S, 3	Covert		Own	292
293	Winther, 49A	3,250	Wisconsin, EAU	4	4x5-25.6	F	N	P	T, Bremer	N	Stromberg	G	M, Eisemann	N	P, Borg & B	S, 4	Brown-L, 50	N	Blood	293
	5,000 Pounds:																			
294	Acason, H	3,850	Waukesha, BU4R	4	4¼x4½-28.9	F	Waukesha	P	C, National	Y	Schebler	G	M, Eisemann	N	P, Borg & B	I, 3	Cotta, CU	Y	Blood	294
295	Ace, A	3,500	Buda, HU	4	4¼x5½-28.9	FS	Pierce	P	C, Modine	Y	Schebler	G	BM, Eis'm'nn	Y	M, M & E	I, 4	Cotta	N	Spicer	295
296	Apex, E	2,450	Buda, HU	4	4¼x5½-28.9	F	Simplex	P	C, Candler	Y	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, GU3	N	Detroit	296
297	Armleder, HW		Continental, C4	4	4¼x5½-27.2	FS		P	T, Long	N	Zenith	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, U50	N	Spicer	297
298	Atterbury, 7CX	3,375	Continental, C4	4	4¼x5½-27.2	FS	Monarch	P	T, Own	N	Zenith	G	M	N	M, Brown-L	S, 4	Brown-L, 35	N	Spicer	298
299	Available, H2½	3,250	Continental, C4	4	4¼x5½-27.2	FS	Pierce	P	T, Chicago	Y	Stromberg	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 35	N	Ther.-Sp.	299
300	Beck, D	3,500	Continental	4	4¼x5½-32.4	F	Pierce	P	C, Ideal	Y	Stromberg	G	M, Bosch	N	M, Cotta	I, 3	Cotta	Y	Blood	300
301	Bell		Buda, HU	4	4¼x5½-28.9	F	Duplex	P	T, Chicago		Stromberg		M, Eisemann		P, Borg & B	S, 3				301
302	Bessemer, J2	3,285	Continental, C2	4	4¼x5½-27.2	S	Pierce	P	C, Standard	Y	Rayfield	G	M, Bosch	N	P, Borg & B	S, 4	Brown-L, 50	N	Arvac	302
303	Bethlehem, EH		Own	4	4x5½-25.6	F	Pierce	T	C, Fedders	N	Stromberg	G	M, Bosch	Y	P, Borg & B	S, 3	Detroit, C	N	Universal	303
304	Betz, D2	2,785	Buda, HU	4	4¼x5½-28.9	FS	Pierce	P	T, Chicago	Y	Stromberg	G	M, Bosch	N	M, Brown-L	S, 4		N	Peters	304
305	Brockway, K4	3,000	Continental, C2	4	4¼x5½-27.2	S	N	P	T, Bush	Y	Stromberg	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 35	N	Spicer	305
306	Chicago, C2½	3,250	Hercules, CU3	4	4x5½-25.6	F	Simplex	P	T, Own	N	Zenith	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 35	N	Peters	306
307	Clydesdale, 65X	3,175	Continental, C4	4	4¼x5½-27.2	S	Own	P	T, Own	Y	Zenith	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 50	N	Spicer	307
308	Columbia, G	2,750	Hinkley, 400	4	4x5½-25.6	F	Hinkley	P	T, Long	N	Stromberg	G	M, Bosch	N	P, Detlaff	S, 3	Covert, RA3	N	Spicer	308
309	Concord, B	2,850	Buda	4	4¼x5½-28.9		Monarch	P	T, Bush		Zenith		M, Eisemann		M, Brown-L	S, 3	Brown-Lipe		Spicer	309
310	Dart, M	3,000	Buda, HU	4	4¼x5½-28.9	F	Pierce	P	C, Own	N	Zenith	G	M, Eisemann	N	M, Fuller	S, 4	Fuller, GU	Y	Spicer	310
311	Day-Elder, C	2,750	Buda	4	4¼x5½-32.4		Monarch	P	T, Bush		Zenith		M, Berling		M, Covert	S, 3	Covert		Hartford	311
312	DeKalb, E2½	2,600	Continental	4	4¼x5½-27.2		N	P	T, Jackson		Master		M, Eisemann	N	M, Fuller	S, 3	Fuller		Hartford	312
313	Denby, 25	3,250	Continental, C2	4	4¼x5½-27.2	F	Monarch	P	T, Long	Y	Stromberg	G	M, Eisemann	N	M, Fuller	S, 4	Fuller, GU	N	Universal	313
314	Dependable, E	2,750	Buda, HTU	4	4¼x5½-28.9	F	Pierce	P	T, Long	N	Zenith	G	M, Dixie	N	M, Fuller	S, 4	Fuller, G5	N	Acme	314
315	Doane	3,750		4	4¼x5½-28.9	FS		P					M, Bosch		M	S, 3	Brown-Lipe			315
316	Erie		Continental	4	4¼x5½-27.2		Pierce		T		Stromberg		M, Bosch		M	S, 4				316
317	Fageol	3,400	Waukesha, RU4R	4	4¼x5½-28.9	FS	Waukesha	P	C, Modine	N	Zenith	D G	M, Dixie	N	M, Brown-L	S, 5	Own	Y	Spicer	317
318	Gary, J	2,750	Buda, HTU	4	4¼x5½-28.9	F	McCanna	P	T, Chicago	Y	Master	G	M, Eisemann	N	M, Fuller	S, 4	Fuller, GU	N	Blood	318
319	Gersix, G	3,150	Buda, LSU	4	4¼x5½-28.9	F	Simplex	P	T, Chicago		Stromberg		M, Bosch		P, Borg & B	I, 3	Cotta, BUA			319
320	Gersix, K	3,150	Buda, HU	4	3½x5½-19.6	S	Monarch	P	C, Ideal		Stromberg		M, Bosch		P, Borg & B	I, 3	Cotta, BUA			320
321	Gramm-Bernstein, 25	3,650		4	4¼x5½-28.9	F		P	T, Own	Y	Stromberg	G	M, Eisemann	N	M, Own	I, 4	Own	N	Own	321
323	Hahn, E	2,500	Continental, E4	4	4¼x5½-32.4	FS	Pierce	P	T, Chicago		Stromberg		M, Bosch		M, Brown-L	S, 3	Brown-Lipe			323
324	Hal-Fur, B	2,750	Buda	4	4¼x5½-28.9		Duplex	P	T, G & O		Stromberg		M, Bosch	N	P, Borg & B	S, 4	Brown-Lipe		Peters	324
325	Harvey, WFA	3,300	Buda	4	4¼x5½-28.9		Duplex	P	T, Chicago		Stromberg		M, Eisemann		P, Borg & B	S, 4	Brown-Lipe		Spicer	325
326	Hawkeye, M	2,650	Buda	4	4¼x5½-28.9		Simplex	P	T, Ideal		Zenith		M, Eisemann		M, Fuller	S, 4	Fuller		Hartford	326
327	Hurlburt	3,750	Buda	4	4¼x5½-28.9	FS	Duplex	P	T, Own		Flechter		M, Eisemann	N	M, Brown-L	S, 3	Brown-L, 35			327
328	Indiana, 25	2,950	Own	4	4¼x5½-27.2	F	Pierce	P	T, Long	Y	Stromberg	G	M, Eisemann	N	P, Borg & B	S, 4	Brown-L, 50	N	Acme	328
329	Jumbo, 25		Buda, HU	4	4¼x5½-28.9	F	Duplex	P	T, Own	N	Zenith	G	M, Eisemann	N	M, Fuller	S, 4	Fuller, GU5	Y	Arvac	329
330	Kalamazoo, H		Wisconsin	4	4x6-25.6	F	Pierce	P	T, G & O	Y	Stromberg	G	M, Bosch	Y	M, Fuller	S, 4	Fuller, G5	N	Acme	330
331	Kankakee, E	2,465	Continental N9	6	3½x5½-25.3	FS		P	C, Auto	N	Zenith	G	B	Y	M, Muncie	S, 3	M'e AS-5-T23N	N	Acme	331
332	Kelly-Springfield, K35	3,500	Own	4	3¾x5½-22.5	F	Pierce	P	C, Long	N	Zenith	G	M, Eisemann	N	C, Own	S, 3	Covert, O	N	Own	332
333	Kelly-Spirngfield, K36	3,500	Own	4	3¾x5½-22.5	F	Pierce	P	C, Long	N	Zenith	G	M, Eisemann	N	C, Own	S, 3	Covert, O	N	Spicer	333
334	Keystone, 40	1,795	Own	4	4x4½-25.6		Pierce	P	T, McCord		Zenith		M, Berling	N	M, Fuller	S, 3	Fuller		Spicer	334
335	Kimball, C	3,975	Wisconsin, UU	4	4¼x6-28.9	FS	Duplex	P	C, Flexo	N	Zenith	D	M, Berling	N	M, Brown-L	S, 4	Brown-L, 50	N	Spicer	335
336	Kleiber, B	3,800	Continental, E4	4	4¼x5½-32.4	S	Pierce	P	T, R'e-T'n'y	N	Stromberg	G	M, Bosch	N	M, Hele-Shaw	S, 4	Brown-L, 60-4	N	Spicer	336
337	Koehler, M	3,162	Hercules, CU3	4	4x5½-25.6	F	Simplex	P	T, Long	Y	Zenith	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 35	N	Spicer	337
338	K-Z	2,950	Continental, C4	4	4¼x5½-27.2	S	Pierce	P	T, Chicago	Y	Stromberg	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 50	N	Thermoid	338
339	Larrabee, SK		Continental, C4	4	4¼x5½-27.2	S	Simplex	P	T, Bush	N	Schebler	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 50	N	Spicer	339
340	L.M.C. 2-20	2,950	Continental, C2	4	4¼x5½-27.2	S	Pierce	P	T, Long	N	Stromberg	G	M, Bosch	N	P, Borg & B	S, 4	Detroit, H	N	Baker	340
341	Maccar, H	3,500	Continental, E4	4	4¼x5½-32.4	F	Pierce	P	T, Own	N	Stromberg	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 50	N	Spicer	341
342	Mapleleaf, BB		Hinkley, HA500	4	4¼x5½-28.9	FS	Hinkley	P	T, McCord	Y	Stromberg	G	M, Bosch	N	M, Fuller	S, 4	Fuller, GU5	N	Blood	342
342a	Master, M	2,790	Buda, HU	4	4¼x5½-28.9	F	McCanna	P	T, Own	N	Master	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 35	Y	Spicer	342a
342b	Master, W	3,090	Buda, HU	4	4¼x5½-28.9	F	McCanna	P	T, Own	N	Master	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 35	Y	Spicer	342b
343	Midland, S	3,150	Buda, HU	4	4¼x5½-28.9	F	Duplex	P	T, Chicago		Stromberg		M, Eisemann		P, Borg & B	S, 4	Brown-L, 50			343
344	Moreland, 19C	3,775	Continental	4	4¼x5½-32.4	FS	N	P	T, Own	N	Miller	D	M, Dixie	N	M, Own	S, 4	Own	N	Thermoid	344
344a	Nelson & LeMoon, F2½		Continental	4	4¼x5½-27.2		Pierce	P	T, Chicago		Stromberg		M, Bosch	N	M, Brown-L	S, 3	Brown-Lipe		Thermoid	344a
345	Netco, H	3,500	Continental, E4	4	4¼x5½-32.4	S	N	P	T, R'e-T'r'y	N	Zenith	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 50	N	Hartford	345
346	Noble, D50		Buda	4	4¼x5½-28.9		Pierce	P	T, Chicago		Stromberg		M, Eisemann		M, Fuller	S, 4	Fuller		M & E	346
347	Ogden, C2		Continental, C2	4	3¾x5-22.5	S	Pierce	T	T, Chicago	Y	Rayfield	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 30		Acme	347
348	Old Reliable, B	3,250	Wisconsin, UU	4	4¼x6-28.9	F	Monarch	P	T, Chicago	Y	Stromberg	G	M, Bosch	N	M, Fuller	S, 4	Fuller, G	Y	Spicer	348
349	Paige, 50-18			4	4¼x5½-27.2		Pierce	P	T	Y	Stromberg	G	M, Bosch	N	M, Brown-L	S, 4	Brown-Lipe	N	Spicer	349
350	Patriot, Washington	3,450	Hinkley, HA	4	4¼x5½-32.4	F	Hinkley	P	T, Own	N	Stromberg	G	M, Splitdorf	N	M, Covert	S, 4	Covert, RA4	N	Thermoid	350
351	Reliance, B20	3,200	Buda, HTU	4	4¼x5½-28.9	F	Pierce	P	T, Bush	N	Stromberg	G	M, Eisemann	Y	M, Fuller	I, 4	Cotta, R	N	Peters	351
352	Republic, 19		Continental, C2	4	4¼x5½-27.2	FS	Pharo	P	C, Own	N	Stromberg	G	M		M, Fuller	S, 4	Fuller, GU5	N	Spicer	352
353	Reynolds, 5A	3,450	Own	4	4¼x5½-28.9	F	Hinkley	P	T, Own	Y	Stromberg	dgk	M, Teagle	Y	M, Own	S, 4	Own		Thermoid	353
354	Rowe, CDW	3,250	Wisconsin	4	4x5-25.6		Duplex	P	Mayo		Zenith		M, Bosch	N	M, Brown-L	S, 4	Brown-Lipe		Arvac	354
355	Royal	3,500	Wisconsin	4	4¼x6-28.9		Monarch	T	T, Kells		Stromberg		M, Bosch		P, Borg & B	I, 3	Own			355
356	Sandow, J	2,975	Continental, C4	4	4¼x5½-27.2	S	Monarch	P	T, Chicago	Y	Stromberg	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 35	N	Spicer	356

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TRUCK SPECIFICATIONS

4,000 (Triangle)—5,000 (Sandow)

Line no.	Final drive (Bevel, Chain, Internal-gear, Spur-and-bevel, Worm) and make of rear axle and model number.	Hotchkiss drive? (Yes or No)	Differential (Bevel, Spur, Worm) and make.	Number and location of driving-wheels (Front, Rear).	Clearance under front and rear axles.	Service and emergency brakes (Contracting, Expanding).	Frame material (Pressed-steel, Rolled-steel) and make.	Front and rear springs (Cantaliver; 1-2, 3-4, or Full elliptic; Transverse).	Make of springs.	Leaves in front and rear springs.	Length and width of front and rear springs.	Driver's position (Left, Right).	Make of steering gear.	Turning-circle diameter (feet and inches).	Wheels (Iron, Steel, Wood) and make.	Wheel-base (standard).	Front and rear tire sizes (dual, pneumatic).	Weight of chassis (pounds).	Perc. of weight on rear axle when empty & when loaded.	Line no.
286	I, Clark, 2D	Y	W, Powrlok	2, R		C, C	R, Mason	½, ½	Detroit	10, 12	42½x2½-54x3	L	Gemmer	56, 0	W, Royer	147	36x4-36x6	4,200	60, 80	286
287	I, Russel, P-300	Y	B	2, R	12, 13½	C, E	R	½, ½	Higgins	9, 11	36x2½-50x2½	L	Lavine	46, 0	W, Standard	144	36x3½-36x5	4,200	40, 70	287
288	C, Own			2, R		E, E	P	½, ½	Kalamazoo				Lavine		W	132	36x5-36x4d			288
289	I, Clark	Y	BW	2, R	12, 12	C, E	R, Own	½, ½	Tuthill	7, 10	36x2½-48x3	L			W, Prudden	140	—x4—x5	3,250	80, 80	289
290	W, Sheldon, W102	Y	W	2, R	12½, 10	E, E	P	½, ½	Sheldon	9, 12	42x2½-56x3	L	Gemmer	37, 10	I, Smith	142	36x4-36x6	4,700	40, 70	290
291	B, Own	N	B	2, R	10½, 9	C, E	P	½, ½				L	Own	60, 0	W	157½	36x4-36x7	4,150	54, 70	291
292	W, Sheldon												Ross			144	36x4-36x6			292
293	I, Clark, 2D	Y	B	2, R	12, 11	C, C	R, Own	½, ½	Mather	8, 10	46x2½-56x3	R	Ross	60, 0	I, Own	147	34x4-34x4d	5,300	45, 80	293
294	W, Timken, 6560	Y	B	2, R	13, 10	E, E	P	½, ½	Detroit	8, 11	40x2½-50x3	R	Ross		W, Bimel	150	36x4-36x7	4,850	—, 76	294
295	W, Timken, 6560	Y	W	2, R	11½, 9½	E, E	P, Parish & B.	½, ½	Mather	10, 12	39x2½-54x3	L	Ross	65, 0	S, Dayton	156	36x4-36x7	5,650	25, 60	295
296	I, Torbensen	Y	B	2, R	11, 13½	C, E	R	½, ½	Detroit	10, 13	39½x2½-52½x3	L	Lavine		W, Bimel	150	36x4-36x6	4,510	—, 66	296
297	W, Timken, 1540B	N	W	2, R	10, 10	E, E	P	½, ½	Mather	7, 9	42x2½-60x3	L	Ross	52, 0	W, St. M'rys	148	36x4-36x4	4,600	60, 80	297
298	W, Timken, 6560	Y	B	2, R	15, 9½	E, E	P	½, ½	Spring Perch	9, 12	41½x2½-54x3	R	Gemmer	55, 9	W, Arch'b'ld	153½	36x4-36x4d	5,070		298
299	W, Wisc., 900C	N	W	2, R	11, 10	E, C	R, Own	½, ½	Tuthill	9, 14	40x2½-52x3	L	Ross	44, 0	W, Schwars	152	36x4-36x8	5,000	55, 75	299
300	W, Timken	N	W	2, R	14, 12	C, E	P	½, ½	Higgins	9, 15	40x2½-52x3½	L	Lavine	48, 0	W, Bimel	144	36x5-36x8	4,200	30, 75	300
301	I, Russel			2, R				½, ½					Gemmer		W	146	34x4-34x6	4,200		301
302	I	N	B	2, R	9½, 12	C, E	P	½, ½	Perfection	10, 12	41½x2½-56x3	L	Ross		W, Schwars	158	36x4-36x4d	4,625	50, 75	302
303	I, Russel, RS	Y	B	2, R	11½, 12½	C, E	P, Detroit	½, ½	Sheldon	9, 11	37½x2½-51½x3	L	Lavine	60, 0	W, Wayne	144	34x4-34x6	3,950	—, 90	303
304	W, Timken, 6560	Y	B	2, R	11, 9	E, E	P, Parish & B.	½, ½	Temme	8, 14	40x2½-55x3	L	Ross	35, 0	S, Dayton	150	36x4-36x7	4,750	75, —	304
305	W, Timken, 6560	N	B	2, R		E, E	P	½, ½	Merrill	10, 13	43x2½-51½x3	L	Gemmer		W, Hoopes	152	36x4-36x7	4,850	54, 84	305
306	W, Timken, 6560	Y	B	2, R	12, 9	E, E	R, Own	½, ½	Mather	9, 13	40x2½-54x3	L	Gemmer		W, Standard	156	36x4-36x4d	4,610	60, 75	306
307	W, Timken, 6560	N	B	2, R	11½, 9	E, E	P, Parish & B.	½, ½	Perfection	7, 10	44x3-52x3	L	Ross	61, 0	I, Smith	163	36x4-36x7	4,850	60, 80	307
308	I, Russel, NI-400	Y	B	2, R		C, E	R	½, ½	Perfection	9, 11	40x2½-52x3½	L	Own		W, St. M'rys	144	36x4-36x7	4,250		308
309	W, Timken			2, R		E, E	P, Parish & B.		Spring Perch			L	Ross		W, Crane	150	36x4-36x4d			309
310	W, Own	Y	B	2, R	10½, 10½	E, E	P, Savage	½, ½	Perfection	8, 11	39x2½-56x3	L	Ross	50,0	W, Prudden	150	36x4-36x7	4,750	50, 80	310
311	W, Wisconsin			2, R		E, E	P, Savage		Iron City			L	Ross		W, Jones	150	36x4-36x7			311
312	W, Timken			2, R		E, E	P, Parish		Mather			L	Ross		W, Schwars	136	36x4-36x6			312
313	I, Russel, U	Y	B	2, R	10, 13	C, E	P, Detroit	½, ½	Detroit	10, 14	44x2½-54x3½	L	Gemmer	57, 1	S, Dayton	149½	36x4-36x7	4,790	52, 79½	313
314	W, Wisc., 900C	Y	W	2, R	10, 10	E, C	P	½, ½	Perfection	11, 14	42x2½-52x3	L	Ross	36, 0	W, Bimel	157	36x4-36x7	5,600	40, 70	314
315	C			2, R		E, E	P	½, ½							W	156	36x5-36x7			315
316	W, Timken						P									160	34x4-36x5			316
317	W, Timken, 6560	Y	B	2, R	9½, 10	E, C	R, Own	½ ½	Mather	9, 13	41x2½-56x3	L	Ross	56, 1	W, Prudden	144	34x4-36x7	4,600	50, 71	317
318	W, Timken, 6560	Y	W	2, R	12, 10½	E, E	P	½, ½	Tuthill	11, 13	44x2½-52x3	L	Ross	42, 0	W, Prudden	148	36x4-36x7	4,850	50, 20	318
319	W, Own			2, R		C, E	R, Own	½, ½	Tuthill				Ross		W, Jones	150	36x4-36x7			319
320	W, Own			2, R		C, E	R, Own	½, ½	Tuthill				Ross		W, Jones	150	36x4-36x7			320
321	W, Standard	Y	B	2, R		E, E	P, Own	½, ½	Perfection		46x2½-58x3	L	Ross	59, 6	I, Smith	150	36x4-36x4d	5,300	73½, 91	321
323	W, Timken			2, R			P		Delaney				Ross		W	156	36x4-36x4d			323
324	W, Timken			2, R		E, E	P, Parish & B.		Spring Perch			L	Gemmer		S, Massillon	168	35x5-36x7			324
325	W, Sheldon			2, R		E, E	R, Own		Sheldon			L	Ross		W, Schwars	150	36x4-36x7			325
326	I, Clark			2, R		C, E	R, Own	½, ½	Detroit			L	Ross		W, Bimel	148½	36x4-36x6			326
327	W, Hindley			2, R		E, C	P, Savage	½, ½	Perfection				Ross		W, Wayne	170	36x4-36x4d			327
328	W, Sheldon, W21	N	B	2, R	12½, 9½	E, E	R	F, ½	Sheldon	9, 14	40x2½-50x3	L	Wohlrab	50, 0	W, Bimel	156	36x4-36x8	6,000	61, 71½	328
329	I, Clark, 2D	Y	B	2, R	10, 11½	C, E	P	½, ½	Detroit	9, 14	40x2½-54x3	L	Jacox	45, 0	S, Clark	152½	36x4-36x7	4,800	50, 75	329
330	W, Sheldon, W21	N	W	2, R	9½, 9	E, E	R	½, ½	Sheldon	8, 13	42x2½-56x3	L	Ross	34, 3	I, Smith	160	36x4-36x8	6,200	—, 80	330
331	I, Russel, S	Y	B	2, R	9, 13½	C, E	R, Own	½, ½	Temme	9, 11	39½x2½-49½x3	L	Ross		W, Bimel	170	34x4-34x6	4,200	30, 70	331
332	C, Own	N	B	2, R	9½, 16	E, E	P	½, ½	Perfection	11, 13	40x2½-44x2½	L	Gemmer	48, 0	W	144	36x4-36x4d	5,200	50, 90	332
333	W, Own	N	B	2, R	9½, 9½	E, E	P	½, ½	Perfection	11, 12	40x2½-47½x3	L	Gemmer	48, 0	W	144	36x4-36x4d	5,540	50, 90	333
334	I, Russel			2, R		E, E	R, Own		Rowland			L	Ditweiler		W, Wayne	144	34x4½p-36x5			334
335	W, Sheldon, W21	Y	B	2, R		E, C	P, Parish	½, ½	U. S	11, 13	40½x2½-50½x3	L	Ross	39, 6	I, Smith		36x6p-36x8		50, 80	335
336	W, Sheldon, W21	Y	W	2, R	9½, 9½	E, E	R, Own	½, ½	Betts	8, 14	44x3-52x3	R	Ross		W, Wat'rh'se	160	36x5-36x8	5,900	50, 75	336
337	W, Timken, 6560	Y	B	2, R	12, 9½	E, E	P, Parish & B.	½, ½	Mather	10, 12	40x2½-56x3	L	Lavine		W, Wayne	162	36x4-36x7	5,000	50, 75	337
338	W, Timken, 6560	N	B	2, R	12½, 10½	E, E	R, Own	½, ½	Tuthill	8, 10	40x2½-50x3	L	Lavine	64, 8	W, St. M'rys	150	36x4-36x8	4,800		338
339	W, Sheldon, W21	Y	B	2, R	15, 10	E, E	P, Parish & B.	½, ½	Merrill	9, 13	41x2½-54x3	L	Ross		W, Hoopes	156	36x4-36x7	5,200	42, 83	339
340	I, Russel, S	Y	B	2, R	10½, 14½	C, E	R, Chopper	½, ½	Mather	9, 11	42x2½-56x3	L	Lavine	47, 0	W, Bimel	164	36x4-36x4d	4,500	53, 75	340
341	W, Timken, 6560	N	B	2, R	12½, 10	E, E	P, Parish	½, ½	Merrill	8, 12	42x2½-56x3	L	Ross		S, Dayton	162	36x4-36x4d	5,000	—, 70	341
342	W, Sheldon, W21	Y	B	2, R	11½, 9½	E, E	R	½, ½	Sheldon		44x2½-54x3	L	Ross	36, 0	W, Hayes	150	36x4-36x4d	5,000	50, 70	342
342a	I, Torbensen, C	Y	B	2, R	9½, 12½	C, E	P, Parish & B.	½, ½	Detroit	11, 13	44½x2½-52x3	L	Ross	42, 0	W, Prudden	144	34x4-36x7	4,800	53, 76	342a
342b	W, Timken, 6560	Y	B	2, R	9½, 10½	E, E	P, Parish & B.	½, ½	Detroit	11, 13	44½x2½-52x3	L	Ross	42, 0	W, Prudden	144	34x4-36x7	4,500	53, 76	342b
343	W, Sheldon, W21					E, E	P, Parish & B.	½, ½	Sheldon				Ross		I, Smith	150	36x4-36x7			343
344	W, Timken, 6552	N	W	2, R	12, 10	E, E	P	½, ½	U. S	10, 11	39½x2½-50x3½	L	Ross	50, 0	I, Smith	144	36x4-36x7	5,400	50, 65	344
344a	W, Timken, 6560	Y		2, R		E, E	R, Own	½, ½	Tuthill			R	Lavine		W, Prudden		36x4-36x7			344a
345	W, Timken, 6560	Y	B	2, R	12, 11	E, E	P	½, ½	Perfection	10, 15	39x2½-49½x3	L	Ross		W, Arch'b'ld	168	36x4-36x8	5,120	57, 65	345
346	W, Sheldon			2, R		E, E	P, Parish & B.		Tuthill			L	Lavine		W, Bimel	162	36x4-36x8			346
347	W, Timken	Y	B	2, R	10, 10	E, E	P, Garden City	C, C	Tuthill	8, 10	38x2½-50x2½	L	Gemmer		W, Stanadrd	160	36x3½-36x4	3,400	—, 70	347
348	W, Sheldon, W21	Y	W	2, R	10½, 9½	E, E	R	½, ½	Sheldon	9, 14	46x3-54x3	R	Ross		W, St. M'rys	160	34x4-36x4d	5,750	—, 70	348
349	W, Timken	N	B	2, R		E, E	P	½, ½	Perfection		45x2½-54x3	L	Jacox		S, Dayton	150	34x4-34x4d	5,000	60, 40	349
350	W, Empire, O	Y	B	2, R	10, 10½	E, E	P, Detroit	½, ½	Cooper	10, 15	44x2½-56x3	L	Ross	51, 10	W, Bimel	156	36x4-36x7	5,200	49, 82	350
351	S, Own	N	B	2, R	10, 10½	E, E	P, Savage	½, ½	Sheldon	9, 11	46x2½-58x2½	L	Ross		W, Bimel	156	36x4-36x4d	5,500	40, 85	351
352	I, Torbensen, D	Y	W, Powrlok	2, R		E, E	P, Detroit	½, ½	Mather	9, 13	38½x2½-52½x3	L	Jacox		W	144	36x4-36x7	4,200		352
353	W, Own	Y	B	2, R	11, 9½	E, E	R, Standard	½, ½	Own		40x2½-54x3	L	Own		I, Smith	152	36x4-36x8			353
354	W, Sheldon, W21			2, R		E, E	R, Own	½, ½	Sheldon			L	Ross		W, Hoopes	164	34x4-36x4d			354
355	W, Timken			2, R		E, E	R, Own		Merrill				Ross		W	132½	36x4½-36x6			355
356	W, Timken, 6560	Y	W	2, R	9½, 9½	E, E	P, Savage	½, ½	Garden City	8, 13	38½x2½-54x3	R	Ross	36, 0	W, Standard	165	36x4-36x7	4,650	20, 70	35

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5,000 (Sanford)—7,000 (Hendrickson) INTERNAL-COMBUSTION

Line no.	Brand name and model name or number	Price f. o. b. factory with seat and tires but without body.	Make of engine and model number.	Number of cylinders.	Bore and stroke, and N. A. C. C. horsepower.	Lubrication (Forced-feed, Splash).	Make of governor (None).	Water-circulation (Pump, Thermo-siphon).	Radiator (Cellular, Tubular) and make.	Radiator guard included in price? (Yes or No)	Make of carbureter.	Fuels (Distillate, Gasolene, Kerosene).	Ignition (Battery, Magneto) and make of magneto.	Electric starting and lighting included in price? (Yes or No)	Clutch (Cone, Multiple-disk, Plate) and make.	Transmission (Individual-clutch, Planetary, Sliding-gear) and number of forward speeds.	Make of transmission and model number.	Power take-off included in price? (Yes or No)	Make of universal joints.	Line no.
	5,000 Pounds—Cont'd																			
357	Sanford, W25	3,290	Cont nental, C4	4	4¼x5½-27.2	F	Pierce	P	T, Long	N	Stromberg	G	M, Bosch	N	P, Borg & B	S, 4	Brown-L, 35	N	Spicer	357
358	Schacht		Buda, HU	4	4¼x5½-28.9	F	Duplex	P	T, Own	N	Schebler	G	M, Bosch	N	C, Own	S, 4	Own	N	M & E	358
359	Schwartz, C2	2,675	Continental, K4	4	4¼x3½-27.2	F	Pierce	P	C, Fedders	N	Stromberg	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 50	N	M & E	359
360	Selden, 2½A		Continental, C4	4	4¼x5½-27.2	S	Pierce	P	T, Long	Y	Stromberg	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 35	N	Spicer	360
361	Service, 51	3,475	Buda, HU	4	4¼x5½-28.9	F	Simplex	P	T, Long	N	Stromberg	G	M, Eisemann	N	P, Borg & B	S, 4	Brown-L, 50	N	Spicer	361
361a	Signal, J	3,275	Continental, C4	4	4¼x5½-27.2	FS	Pierce	P	T, McCord	Y	Stromberg	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 50	N	Spicer	361a
362	Sterling	3,475	Own	4	4¾x5½-30.6	F	Waukesha	P	C, Own	Y	Rayfield	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 50	N	Spicer	362
363	Super Truck, 50		Wisconsin, TAU	4	4x6-25.6	F	Simplex	P	T, Chicago	Y	Zenith	G	M, Bosch	N	M, Fuller	S, 4	Fuller, GU	Y	Thermoid	363
364	Tiffin, MW	3,200	Continental, C4	4	4¼x5½-27.2	FS	Pierce	P	T, Own	Y	Schebler	G	M, Bosch	N	M, Fuller	S, 4	Fuller, GU	Y	Peters	364
365	Titan	3,400	Buda, HTU	4	4¼x5½-28.9	F	Simplex	P	T, B & W	N	Stromberg	G	M, Eisemann	N	P, Borg & B	I, 4	Cotta, AU	N	M & E	365
366	Tower, H	3,385	Continental, C4	4	4¼x5½-27.2	S	Pierce	P	T, Own	N		G	M	N	M, Fuller	S, 3	Fuller, TU	N		366
367	Traylor, D	3,375	Buda, MTU	4	4¼x5½-28.9	F	Pierce	P	T, G & O	N	Zenith	G	M, Dixie	N	M, Covert	S, 4	Covert	N		367
368	Triangle, B	2,850	Waukesha, FU	4	4x5½-25.6	FS	Waukesha	P	T, Perfex	N	Stromberg	G	M, Eisemann	N	M, Fuller	S, 4	Fuller, GU	Y	Detroit	368
369	Ultimate, B		Buda, HTU	4	4¼x5½-28.9	F	Pierce	P	T, Own	N	Stromberg	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 50	N	Spicer	369
370	Union, F	2,925	Wisconsin, TAU	4	4x6-25.6	F	Duplex	P	T, Own	N	Schebler	G	M, Eisemann	N	M, Fuller	S, 4	Fuller, GU	N	Universal	370
371	United, B		Buda, HU	4	4¼x5½-28.9	F	Simplex	P	T, G & O		Stromberg		M, Bosch		M, Brown-L	S, 4	Brown-L, 35			371
372	U. S., H	3,250	Continental	4	4¼x5½-27.2		Pierce	P	C, Fedders		Stromberg		M, Eisemann		C, Hartford	S, 4	Brown-L		Blood	372
373	Walker-Johnson, B	2,890	Buda, HTU	4	4¼x5½-28.9	F	Pierce	P	T		Zenith		M, Eisemann		M	S, 4				373
374	Ward LaFrance, 2B	3,590		4	4¼x5½-30.6	F		P	T, Own	Y	Zenith	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 50	N	Spicer	374
375	Watson, 19		Waukesha, CU	4	4¾x5½-30.6	F	Waukesha	P	T, R'e-T'n'y	N	Stromberg	G	M, Simms	N	M, Brown-L	S, 4	Brown-L, 35	N	Spicer	375
376	Wichita, R	2,950	Waukesha	4	3¾x5½-22.5		Waukesha	P	Perfex		Stromberg				C	S, 3	Covert		Own	376
377	Wilcox, C		Own	4	4¼x5-28.9	S	Pierce	P	T, Long	N	Stromberg	G	M, Bosch	N	C, Own	S, 4	Own	N		377
378	Wilson	3,150	Continental, C4	4	4¼x5½-27.2	FS	Pierce	P	T, Own	N	Marvel	G	M, Eisemann	N	P, Borg & B	S, 4	Brown-L, 50	N	Thermoid	378
379	Winther, 450	3,690	Wisconsin, EAU	4	4x5-25.6	F	N	P	T, Bremer	N	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, LTU5	N	Peters	379
380	Wisconsin, C	2,850	Waukesha	4	4x5½-25.6		Waukesha	P	T, Chicago		Master		M, Eisemann		M, Fuller	S, 3	Fuller			380
381	Witt-Will, P	2,950	Continental	4	4¼x5½-27.2		Pierce	P	C, Modine		Zenith		M, Eisemann	N	M, Brown-L	S, 3	Brown-Lipe		Spicer	381
	6,000 Pounds:																			
382	A & B, 3T	4,500	Own	4	5¼x4½-42.8		N	P	T, Bush		Schebler		M, Bosch	N	N	* 2	*		Franck	382
383	Beck, D	3,500	Continental	4	4¼x5½-32.4	F	Pierce	P	C, Ideal	Y	Stromberg	G	M, Bosch	N	M, Cotta	I, 3	Cotta	Y	Blood	383
384	Beech Creek, 3A	3,850	Waukesha	4	4¼x5½-28.9		Waukesha	P			Master		M, Eisemann		M, Fuller	S, 3	Fuller			384
384a	Douglas, I	3,350	Buda	4	4¼x5½-28.9		Pierce	P	, Own		Schebler		M, Eisemann		M, Fuller	S, 4	Fuller		Arvac	384a
385	Forschler, BX	3,450	Continental	4	4¼x5½-27.2		Duplex	P	T, Own	Y	Zenith	G	M, Bosch		M, Fuller	S, 4	Fuller		Own	385
386	FWD, B	4,500	Wisconsin, A	4	4¼x5½-36.1	FS	Pierce	P	T, Long	N	Stromberg	G	M, Eisemann	N	M, Hele-Shaw	I, 3	Cotta, DAF	N	Blood	386
387	Jumbo, 30		Buda, HU	4	4¼x5½-28.9	F	Duplex	P	T, Own	N	Zenith	G	M, Eisemann	N	M, Fuller	S, 4	Fuller, GU5	Y	Arvac	387
388	Kimball, K	4,400	Wisconsin, AU	4	4¼x5½-36.1	FS	Duplex	P	C, Flexo	N	Zenith	D	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 50	N	Spicer	388
389	O. K., 3T	3,350	Buda	4	4¼x5½-28.9	F	Pierce	P	T, Chicago		Zenith		M, Eisemann		M, Fuller	S, 4	Fuller			389
390	Packard, 3E	4,350	Own	4	4¼x5½-32.4	F	Own	P	C, Fedders	N	Own	G	M, Dixie	N	M, Own	S, 4	Own	N	Ther.-Sp.	390
391	Riker, B		Own	4	4½x6-28.9	S	Own	P	T	N	Own	G	M, Berling	N	C, Own	S, 4	Own	N	Own	391
392	Rowe, DEW	3,800		4	4x6-25.6		Duplex	P	C, Mayo		Zenith		M, Bosch	N	M, Brown-L	S, 4	Brown-Lipe		M & E	392
393	Rowe, DGW	4,500	Herschell-Spill	8	3½x5-33.8		N	P	C, Mayo		Zenith		Atwater-K	Y	M, Brown-L	S, 4	Brown-Lipe		M & E	393
394	Vim, 23	3,950	Hercules	4	4¼x5½-28.9	F	Duplex	P	T, McCord	N	Zenith	G	M, Dixie	N	M, Brown-L	S, 4	Brown-L, 50	N	Spicer	394
395	Walter (N. Y.), T		Waukesha, CU	4	4¼x5½-30.6	F	Own	P	T, Bush	Y	Stromberg	G	M, Simms	Y	M, Brown-L	S, 4	Brown-L, 50		M & E	395
396	White, 40	4,500	Own	4	3¾x5½-22.5	F	Own	P	T, Own	N	Own	G	M	N	P, Own	S, 4	Own	N	Own	396
	7,000 Pounds:																			
397	Acason, L	4,900	Waukesha, LU7	4	4¼x6½-28.9	F	Waukesha	P	C, National	Y	Stromberg	G	M, Eisemann	N	P, Borg & B	I, 3	Cotta, CU	Y	Blood	397
398	Acme, C	4,050	Continental, E7	4	4¼x5½-32.4	FS	Duplex	P	T, G & O	N	Rayfield	G	M, Eisemann	N	P, Borg & B	I, 4	Cotta, C	N	Blood	398
399	All-Power, SV4	4,800	Continental	4	4¼x5½-32.4		Pharo	P	T, McCord		Zenith		M, Eisemann	Y	M, Detlaff	I, 3	Cotta		Universal	399
400	Armleder, KW		Continental, E4	4	4¼x5½-32.4	FS		P	T	N	Zenith	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, U50	N	Spicer	400
401	Atterbury, 7D	4,175	Continental, E4	4	4¼x5½-32.4	FS	Monarch	P	T, Own	N	Zenith	G	M	N	M, Brown-L	S, 4	Brown-L, 50	N	Spicer	401
402	Available, H3	4,200	Continental, E4	4	4¼x5½-32.4	FS	Pierce	P	T, Chicago	Y	Stromberg	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 50	N	Ther.-Sp.	402
403	Belmont, D	3,550	Buda, YU	4	4¼x6-32.4	F	Pierce	P	T, Chicago	Y	Zenith	G	M, Eisemann	N	M, Fuller	S, 4	Fuller, G	N	Sterling	403
404	Bethlehem, FJ		Own	4	4¼x5½-32.4	F	Pierce	P	C, Fedders	N	Stromberg	G	M, Bosch	Y	P, Borg & B	S, 3	Detroit, C	N	Spicer	404
405	Brockway, R2	3,900	Continental, E4	4	4¼x5½-32.4	S	N	P	T, Bush	Y	Stromberg	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 50	N	Spicer	405
406	Chicago, C3½	4,450	Hercules, MU3	4	4¼x5½-32.4	F	Simplex	P	T, Own	N	Zenith	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 50	N	Peters	406
407	Clydesdale, 90	4,075	Continental, E4	4	4¼x5½-32.4	S	Own	P	T, Own	Y	Zenith	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 60	N	Spicer	407
408	Dart, W	4,000	Buda, YU	4	4¼x6-32.4	F	Pierce	P	C, Own	N	Zenith	G	M, Eisemann	N	M, Fuller	S, 4	Fuller, HU	Y	Spicer	408
409	Day-Elder, F	3,350	Continental	4	4¼x5½-32.4		Monarch	P	T, Bush		Zenith		M, Berling		M, Brown-L	S, 4	Brown-Lipe		Hartford	409
410	Denby, 27	4,250	Continental, E7	4	4¼x5½-32.4	F	Monarch	P	T, Long	Y	Stromberg		M, Eisemann	N	M, Own	S, 4	Fuller, G5	N	Universal	410
411	Diamond T, LB	4,390	Continental	4	4¼x5½-32.4	FS	Pierce	P	T, G & O	N	Stromberg	G	M, Bosch	N	M, Brown-L	S, 4	Brown-Lipe	N	Spicer	411
412	Dorris, K7	4,400	Own	4	4¼x5½-28.9	F	Own	P	T, McCord	Y	Stromberg	G	M, Bosch	N	M, Warner	S, 4	Warner, T53	N	Spicer	412
413	Duplex, E	4,250	Buda, TU	4	4¼x5½-28.9	S	Duplex	P	T, Long	N	Schebler	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 50	Y	Peters	413
414	Erie		Continental	4	4¼x5½-32.4		Pierce		T		Stromberg		M, Bosch			S, 4				414
415	Fageol	4,500	Waukesha, DU	4	4¼x6½-32.4	S	Waukesha	P	C, Modine	N	Zenith	DG	M, Dixie	N	M, Brown-L	S, 5	Own	Y	Spicer	415
416	Federal, WD	3,850	Continental, E4	4	4¼x5½-32.4	FS	Pharo	P	T, McCord	Y	Zenith	G	M, Eisemann	N	P, Borg & B	S, 4	Warner, AXD	N	Spicer	416
417	Garford, 77C	4,300		4	4¼x5½-36.1	F	Simplex	P	T, Own	N	Rayfield	G	N, Splitdorf	N	M	S, 4		N		417
418	Garford, 77D	4,190		4	4¼x6-32.4	F	Simplex	P	T, Own	N	Rayfield	G	M, Splitdorf	N	M	S, 4		N		418
419	Gary, KT	3,850	Buda, YTU	4	4¼x6-32.4	F	McCanna	P	T, Chicago	Y	Master	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 50	N	Spicer	419
420	Giant, 17	4,150	Continental, E4	4	4¼x5½-32.4	FS	Pierce	P	C, Own	Y	Stromberg	G, K	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 50	N		420
421	GMC, 71A	3,950	Continental, E4	4	4¼x5½-32.4	FS	Monarch	P	T, Own	N	Marvel	G	M, Eisemann	N	M, Own	S, 4	Own	N	Own	421
422	Gramm-Bernstein, 35	4,450		4	4¼x5½-32.4	F		P	T, Own	Y	Stromberg	G	M, Eisemann	N	M, Own	I, 4	Own	N	Own	422
423	Hall	3,750	Continental, E4	4	4¼x5½-32.4	FS	Simplex	P	T, G & O	Y	Zenith	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 50	N	Hartford	423
424	Harvey, WHA	4,300	Buda	4	4¼x6-32.4		Duplex	P	T, Chicago		Stromberg		M, Eisemann		P, Borg & B	S, 4	Brown-Lipe		Spicer	424
425	Hendrickson	3,800	Buda	4	4¼x5½-28.9		Pierce	P	T, Chicago		Stromberg		M, Dixie	N	M, Fuller	S, 4	Fuller			425

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TRUCK SPECIFICATIONS

5,000 (Sanford)—7,000 (Hendrickson)

Line no.	Final drive (Bevel, Chain, Internal-gear, Spur-and-bevel, Worm) and make of rear axle and model number.	Hotchkiss drive? (Yes or No)	Differential (Bevel, Spur, Worm) and make.	Number and location of driving-wheels (Front, Rear).	Clearance under front and rear axles.	Service and emergency brakes (Contracting, Expanding).	Frame material (Pressed-steel, Rolled-steel) and make.	Front and rear springs (Cantaliver; 1-2, 3-4, or Full elliptic; Transverse).	Make of springs.	Leaves in front and rear springs.	Length and width of front and rear springs.	Driver's position (Left, Right).	Make of steering gear.	Turning-circle diameter (feet and inches).	Wheels (Iron, Steel, Wood) and make.	Wheel-base (standard).	Front and rear tire sizes (dual, pneumatic).	Weight of chassis (pounds).	Perc. of weight on rear axle when empty & when loaded.	Line no.
357	W, Sheldon, W21..	Y	B	2, R	11, 9½	E, E	P	½, ½	Perfection	9, 13	42x2½-52x3	L	Ross	58, 0	W, Hoopes..	174	36x4-36x4d	5,500	73, 87	357
358	W, Own	N	B	2, R	11, 9	C, E	R, Own	½, ½	National	9, 14	35x2½-50x3	L	Own		W,St.M'rys.	156	36x4-36x4d	6,000	80, 80	358
359	I, Torbensen, D..	Y	B	2, R	10, 11¾	C, E	P, Parish	½, ½	Rowland	10, 15	40½x2½-54x3	L	Ross		W, Schwarz.	150	34x4-34x7	4,200		359
360	W, Timken, 6560..	N	B	2, R	12, 10½	E, E	P, Parish & B.	½, ½	Perfection	9, 14	40x2½-54x3	R	Gemmer	54, 0	W	145	36x4-36x7	5,400	56, 75	360
361	W, Timken, 6560..	Y	B	2, R	12, 9¾	E, E	P	½, ½	Mather	10, 14	42x2½-54x3	L	Ross	48, 0	W, Bimel..	160	36x4-36x7	5,180	—, 70	361
361a	W, Timken, 6560..	N	B	2, R	11, 11	E, E	P, Savage	½, ½	Detroit	10, 13	44x2½-56x3	L	Ross	60, 0	W, Hayes..	150	34x4-36x8	5,210	—, 76	361a
362	W, Timken, 6560..	N	W	2, R	12½, 9¾	E, E	P, W	½c ½c	Mather	8, 12	48x3-54x3	L	Ross	52, 9	W, Prudden.	156	36x4-36x4d	5,500	60, 88	362
363	W, Sheldon, W21..	Y	B	2, R	11½, 9¾	E, E	P	½, ½	Sheldon	10, 12	40x2½-50x3	L	Lavine	49, 0	W	156	36x4-36x8	5,250		363
364	W, Sheldon, W21..	N	B	2, R	10, 11	E, E	P	½, ½	Kalamazoo	11, 14	44x2½-50x3	L	Ross	52, 0	I, Smith	148	36x4-36x3½d	4,890	40, 60	364
365	I, Clark, 2D	N	B	2, R	11, 14	E, C	P, Parish & B.	½, ½	Sheldon	9, 11	46x2½-54x3	L	Wohlrab.	38, 0	W	156	34x4-36x4d	4,975	51, 78	365
366	W, Timken	N	B	2, R	11, 11	E, E	P	½, ½	Detroit		44x2½-56x3	L	Ross		W	146	36x4-36x7	4,700	—, 75	366
367	W, Sheldon, W21..	Y	W	2, R		E, E	P, Savage	½, ½			40x2½-52x3	L	Ross		W, Schwarz.	150	36x4-36x7	5,500		367
368	I, Clark, 2D	Y	W, Powrlok	2, R	13, 11	C, C	R	½, ½	Detroit	10, 12	42½x2½-54x3	L	Gemmer	56, 0	W, Royer	151	36x4-36x7	4,900	60, 80	368
369	W, Sheldon, W21..	N	B	2, R	10, 9½	E, E	P	½, ½	Sheldon	10, 16	39x2½-52x3	L	Ross	49, 0	W	154	36x4-36x4d	5,340	50, 70	369
370	I, Russel, T	Y	B	2, R	13, 16	C, E	P, Own	½, ½	Mather	8, 14	44x2½-56x3	L	Ross		W, Prudden.	152	36x5-36x8	5,100	50, 70	370
371	I, Clark, 2D			2, R		E, C	P, Detroit	½, ½	Detroit				Jacox		W	151	36x4-36x7			371
372	W, Sheldon			2, R		E, E	R, Own		Sheldon			L	Lavine		W, Schwarz.	144	34x4-36x4d			372
373	W, Timken			2, R		E, E							Ross		W	150	36x4-36x8			373
374	W, Timken, 6560..	N	W	2, R	12½, 9¾	E, E	P, Detroit	½, ½			40x2½-54x3	L	Ross		W	158	36x4-36x4d	5,400	—, 85	374
375	W, Empire, O	Y	B	2, R	11, 10	E, E	P, Parish	½, ½	Sheldon		42x2½-54x3	L	Gemmer		W, Crane	156	36x4-36x7			375
376	W, Sheldon			2, R									Ross			144	36x4-36x7			376
377	W, Wisc., 900C	Y	B	2, R		E, E	P	½, ½	Sheldon	9, 12	40x2½-56x3	L	Own		I, Smith	150	36x4-36x3½d	5,000	25, 75	377
378	W, Timken, 6560..	Y	B	2, R	12½, 9¾	E, E	R, Own	½, ½	Perfection	11, 12	40x2½-52x3	L	Ross		W	152	36x4-36x7	4,600	60, 80	378
379	I, Clark, 2D	Y	B	4, FR	12½, 12	C, E	R, Own	½, ½	Mather	11, 15	40x2½-48x2½	L	Lavine	62, 0	I, Own	150	34x5-36x6	4,800	30, 60	379
380	W, Sheldon			2, R		E, E	P, Smith						Lavine		W	156	36x4-36x6			380
381	W, Timken			2, R		E, E	P, Parish		Delaney			L	Ross		W,Archibald	144	36x3½-36x7			381
382	I, Own			2, F		C, E	R, Own	½, ½	Spring Perch			R	Gemmer		W,Archibald	144	48x3½d-48x3½d			382
383	W, Timken	N	W	2, R	14, 12	C, E	P	½, ½	Higgins	9, 15	40x2½-52x3½	L	Lavine	48, 0	W, Bimel	144	36x5-36x8	4,200	30, 75	383
384	B, Own			2, R		C, C							Own			132	36x6-36x6			384
384a	W, Wisconsin			2, R		E, E			Own				Ross			136	36x5-36x8	4,750		384a
385	W, Sheldon			2, R		E, E	R, Own	½, ½	Own			L	Ross		I, Smith	144	36x4-36x8			385
386	B, Own	Y	B	4, FR	9 11/16, 9 11/16	C, C	P, Parish & B.	¾P ¾P	Tuthill	11, 10	45½x2½-44x2½	R	Ross	51, 0	W, Schwarz.	124	36x6-36x6	6,400	38, 55	386
387	I, Clark, 2D	Y	B	2, R	10, 13½	C, E	P	½, ½	Detroit	9, 14	40x2½-54x3	L	Jacox	45, 0	S, Clark	152½	36x6p-42x9p	5,000	50, 75	387
388	W, Sheldon, W21..	Y	B	2, R		E, C	P	½, ½	U. S	11, 13	40¾x2½-50¾x3	L	Ross	39, 6	I, Smith		36x4-36x10		50, 80	388
389	W, Wisc., 900			2, R		E, E	P, Savage	½, ½	Tuthill				Ross		W	154	36x4-36x8			389
390	W, Own	N	S	2, R	10¼, 9½	C, E	R, Own	½, ½		11, 12	42½x3-46x3	L	Own	56, 0	I	156	36x5-36x5d	7,000	52, 72	390
391	W, Own	N	B	2, R	12, 9	C, E	P	½, ½		9, 14	42x3-54x3	R	Ross	55, 0	S	150	36x5-36x5d	6,900	62, 75	391
392	W, Sheldon			2, R			R, Own	½, ½	Sheldon			L	Ross		W, Hoopes		36x5-36x5d			392
393	W, Sheldon			2, R			R, Own	½, ½	Sheldon			L	Ross			170	38x7p-42x9p			393
394	W, Sheldon, W21..	Y	W	2, R	10½, 9	E, E	P	½, ½	Sheldon	10, 11	42x3-58x3½	L	Gemmer	46, 2	I, Smith	175	36x5-36x5d	6,000	40, 70	394
395	I, Own	Y	W	2, R	14, 14	C, C	P	½, ½	Perfection		48x3-52x4	L	Ross	48, 0	S, Dayton	168	38x7p-42x9p	6,000	50, 75	395
396	I, Own	N	BS	2, R	10¼, 10¼	C, E	R	½, ½				L	Own	61, 0	S	174	36x5-40x5d	7,075	54, 70	396
397	W, Timken, 6652..	Y	B	2, R	11, 10	E, E	P, Savage	½, ½		11, 13	40x3-50x3½	R	Ross		I, Smith	172	36x5-36x5d	6,400	—, 76	397
398	W, Timken, 6652..	N	B	2, R	8, 9½	E, E	P	½, ½	Detroit	11, 14	42x3-54x3½	L	Ross	58, 0	W, Bimel	168	36x5-40x5d	6,500	56, 80	398
399	W, Timken			2, R		C, E	P, Parish	½, ½	Tuthill			L	Ross		S, Clark	166	36x6-36x10			399
400	W, Timken, 1631B	N	W	2, R	10, 9	E, E		½, ½	Mather	8, 13	48x3-60x3	L	Ross	58, 0	W,St. Marys	156	36x5-36x5d	7,200	60, 80	400
401	W, Timken, 6652..	Y	B	2, R		E, E	P	½, ½	Spring Perch	11, 14	41½x3-56x3½	R	Gemmer	59, 10	W,Archibald	167½	36x5-40x5d	6,720		401
402	W, Timken, 6652..	N	W	2, R	9, 10	E, E	R, Own	½, ½	Tuthill	8, 12	42x3-54x3½	L	Ross		W, Schwarz.	176	36x5-40x5d	6,400	55, 75	402
403	I, Clark	N	B	2, R	11, 11	C, E	R	½, ½	Mather	8, 12	44x3-56x3½	L	Lavine	64, 0	S, Clark	160	36x5-40x5d	6,800	50, 80	403
404	I, Russel, T	Y	B	2, R	11¼, 12½	C, E	P, Detroit	½, ½	Sheldon	10, 15	37½x2½-51½x3	L	Lavine	65, 0	W, Wayne	162	34x4-34x5d	4,960	27, 90	404
405	W, Timken, 6652..	N	B	2, R		E, E	P, Parish & B.	½, ½	Merrill	12, 15	44x2½-52x3½	L	Gemmer		I, Smith	164	36x5-36x5d	6,430	60, 82	405
406	W, Timken, 6652..	Y	B	2, R	9½, 8¾	E, E	R, Own	½, ½	Mather	10, 15	40x2½-54x3	L	Gemmer		W, Standard	168	36x5-36x10	6,850	60, 75	406
407	W, Timken, 6652..	N	B	2, R	14½, 10½	E, E	P, Parish & B.	½, ½	Perfection	9, 13	44x3-54x3½	L	Ross	65, 0	I, Smith	190	36x5-40x10	6,600	60, 78	407
408	W, Own	Y	B	2, R	11½, 10½	E, E	R, Savage	½, ½	Perfection	8, 15	44x3-56x3½	L	Ross	60, 0	W, Prudden	160	36x5-36x10	6,450	50, 80	408
409	W, Wisconsin			2, R		E, E	P, Savage		Iron City			L	Ross		W, Jones	165	36x5-36x5d			409
410	I, Clark, 3	Y	B	2, R	13½, 11½	C, E	P, Detroit	½, ½	Detroit	8, 18	42x3-54x3½	L	Gemmer	56, 8	I, Smith	170	36x5-36x10	6,890	56, 78	410
411	W, Timken	Y	W	2, R		E, E	P	½, ½	Mather	8, 15	46x3-56x3	R	Gemmer		I, Smith	170	36x5-36x5d	6,425	50, 90	411
412	W, Timken, 6652..	Y	W	2, R	9½, 9	E, E	P, Smith	½, ½	Rowland	9, 15	42x3-56x4	L	Ross	60, 0	I, Smith	154	36x5-36x10	6,750	86, 70	412
413	I, Own	N	S	4, FR	15, 15	C, C	P, Parish & B.	½, ½	Tuthill	6, 8	41¾x3-41¾x3	L	Wohlrab.	60, 0	W, Prudden	130	36x8-36x8	3,800	40, 60	413
414	W, Timken			2, R			P									168	36x5-40x5d			414
415	W, Timken, 6652..	N	B	2, R	14½, 8 5/16	E, E	P, Own	½, ½	Mather	7, 13	44x3-60x3½	L	Ross	59, 8	W, Prudden	172	36x5-36x5d	7,300	53, 69	415
416	W, Timken, 6652..	N	B	2, R	10, 8	E, E	P	½, ½	Mather	8, 12	44x3-56x3½	L	Gemmer	48, 10	I, Smith	156	36x5-36x5d	7,000	62, 75	416
417	W	N	B	2, R		E, E	P	½, ½		9, 14	48x3-56x3½	L			W	128	36x5-40x5d	7,235		417
418	W	Y	B	2, R		E, E	P	½, ½		9, 17	42x3-56x3½	L		58, 0	I	162	36x5-36x5d	7,550		418
419	W, Timken, 6652..	Y	W	2, R	9, 10½	E, E	P	½, ½	Detroit	10, 14	44x3-58x4	L	Ross	46, 0	W, Prudden	162	36x5-40x5d	7,000	50, 20	419
420	W, Sheldon, W30..	Y	B	2, R	10, 8½	E, E	R	½, ½	Sheldon	9, 15	44x3-60x4	R	Ross		W, Wayne	176	36x5-36x5d	6,000	40, 70	420
421	W, Timken, 6652..	N	B	2, R	12¼, 10¼	E, E	R, Own	½, ½	Detroit	10, 12	44x3-54x4	L	Jacox	55, 0	Own	163	36x5-40x5d	6,985	56, 75	421
422	W, Standard	Y	B	2, R		E, E	P, Own	½, ½	Perfection		46x3-62x3½	L	Ross	61, 0	I, Smith	156	36x5-40x5d	6,900	76, 91½	422
423	W, Timken, 6652..	Y	W	2, R	9, 8	E, E	R	½, ½	Detroit	12, 16	45x2½-54x3½	L	Gemmer		I, Smith	144	36x5-36x5	6,825	25, 80	423
424	W, Sheldon			2, R		E, E	R, Own		Sheldon			L	Ross		W, Schwarz.	160	36x5-36x5d			424
425	W, Timken			2, R				½, ½	Tuthill				Ross		W	160	36x5-36x5d			425

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7,000 (Hurlburt)—10,000 (Atterbury) INTERNAL-COMBUSTION

Line no.	Brand name and model name or number	Price f. o. b. factory with seat and tires but without body.	Make of engine and model number.	Number of cylinders.	Bore and stroke, and N. A. C. C. horse-power.	Lubrication (Forced-feed, Splash).	Make of governor (None).	Water-circulation (Pump, Thermo-siphon).	Radiator (Cellular, Tubular) and make.	Radiator guard included in price? (Yes or No)	Make of carbureter.	Fuels (Distillate, Gasolene, Kerosene).	Ignition (Battery, Magneto) and make of magneto.	Electric starting and lighting included in price? (Yes or No)	Clutch (Cone, Multiple-disk, Plate) and make.	Transmission (Individual-clutch, Planetary, Sliding-gear) and number of forward speeds.	Make of transmission and model number.	Power take-off included in price? (Yes or No)	Make of universal joints.	Line no.
	7,000 Pounds—Cont.																			
426	Hurlburt, C	4,400	Buda, YTU	4	4½x6-32.4	FS	Duplex	P	T, Own		Flechter		M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 50			426
427	Indiana, 35	3,600	Own	4	4¾x5½-30.6	F	Pierce	P	T, Long	Y	Stromberg	G	M, Eisemann	N	P, Borg & B	S, 4	Brown-L, 50	N	Spicer	427
428	International, L	4,500	Own	4	4¼x5-28.9	FS	Own	T	T, Own	Y	Ensign	G	M, Dixie	N	M, Own	S, 4	Own	N	Own	428
429	Jackson, C1920	4,250	Continental	4	4½x5½-32.4		Pierce	P	T, Long		Stromberg		M, Eisemann		P, Borg & B	S, 4	Own		Spicer	429
430	Jumbo, 35		Buda, YTU	4	4½x6-32.4	F	Duplex	P	T, Own	Y	Zenith	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 50	Y	Spicer	430
431	Kalamazoo, K		Wisconsin	4	4½x6-28.9	F	Pierce	P	T, G & O	Y	Stromberg	G	M, Bosch	Y	M, Fuller	S, 4	Fuller, G5	N	Acme	431
432	Kelly-Springfield, K40	4,400	Own	4	4½x6½-32.4	F	Pierce	P	C, Long	N	Zenith	Y	M, Eisemann	N	C	S, 3	Covert, K	N	Own	432
433	Kelly-Springfield, K41		Own	4	4½x6½-32.4	F	Pierce	P	C, Long	N	Zenith	G	M, Eisemann	N	P, Borg & B	S, 4	Covert, SA4	N	Spicer	433
434	Kelly-Springfield, K42		Own	4	4½x6½-32.4	F	Pierce	P	C, Long	N	Zenith	G	M, Eisemann	N	P, Borg & B	S, 4	Covert, SA4	N	Spicer	434
435	Kissel, Heavy Duty	3,975	Own	4	4¼x5½-28.9	S	Pierce	P	T, Fedders	N	Stromberg	G	M, Eisemann	N	M, Warner	S, 4	Warner, T53	N	Spicer	435
436	Kleiber, C	4,400	Continental, E4	4	4½x5½-32.4	S	Pierce	P	T, R'e-T'rn'y	N	Stromberg	G	M, Bosch	N	M, Hele-Shaw	S, 4	Brown-L, 60-4	N	Spicer	436
437	K-Z	4,200	Continental, E4	4	4½x5½-32.4	S	Pierce	P	T, Chicago	Y	Stromberg	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 50	N	Thermoid	437
438	Larrabee, SL		Continental, E4	4	4½x5½-32.4	S	Simplex	P	T, Bush	N	Schebler	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 50	N	Spicer	438
439	Macear, M	4,350	Continental, E4	4	4½x5½-32.4	F	Pierce	P	T, Own	N	Stromberg	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 50	N	Spicer	439
440	Mack, AC		Own	4	5x6-40.0	S	Own	P	T, Own	N	Zenith	G	M, Dixie	N	P, Own	S, 3	Own	Y	Spicer	440
441	Mapleleaf, CC		Hinkley, HA200	4	4½x5½-32.4	FS	Hinkley	P	T, McCord	Y	Stromberg	G	M, Bosch	N	M, Fuller	S, 4	Fuller, GU5	N	Blood	441
442	Master, A	4,190	Buda, YTU	4	4½x6-32.4	F	Pierce	P	T, Own	N	Master	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 50	Y	Spicer	442
443	Menominee, G		Continental, E4	4	4½x5½-32.4	S		P	T, Own	N	Stromberg	G	M, Eisemann	N	P, Borg & B	S, 4	Brown-L, 50	N	Spicer	443
444	National, IA		Waukesha, NU4R	4	4½x5½-32.4	S	Waukesha	P	C, McKinnon	Y	Zenith	G	M, Eisemann	N	M, Hele-Shaw	S, 4	Brown-L, 50	N	Spicer	444
445	Nelson & LeMoon, F3½		Continental, E4	4	4½x5½-32.4	FS	Pierce	P	T, Chicago		Stromberg		M, Bosch		M, Brown-Lipe	S, 4	Brown-L, 50		Thermoid	445
446	Noble, E70		Buda, YTU	4	4½x6-32.4	F	Pierce	P	T, Chicago		Stromberg		M, Eisemann		M, Fuller	S, 4	Fuller, G5			446
447	Northway, B3	4,250	Own	4	4x6-25.6	FS	Pierce	P	C, G & O	Y	Schebler	G	B	Y	M, Fuller	S, 4	Fuller, GU5	N	Spicer	447
448	Old Reliable, C	4,000	Wisconsin, UU	4	4¼x6-28.9	F	Monarch	P	T, Chicago	Y	Stromberg	G	M, Bosch	N	M, Fuller	S, 4	Fuller, G	Y	Spicer	448
449	Paige, 51-18			4	4½x5½-32.4		Pierce	P	T	Y	Stromberg	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L	Y	Spicer	449
450	Parl e, J9	4,150	Wisconsin, VAU	4	4½x6-32.4	F	Monarch	P	T, Own	Y	Stromberg	G	M, Bosch	Y	M, Brown-L	S, 4	Warner, T53-1	N	Kinsler-B	450
451	Republic, 20		Continental, E4	4	4½x5½-28.9	FS	Pharo	P	T, Own	N	Stromberg	G	M		M, Fuller	S, 4	Fuller, GU5	N	Hartford	451
452	Reynolds, 7A	4,350	Own	4	4½x5½-32.4	F	Hinkley	P	T, Own	Y	Stromberg	dgk	M, Teagle	Y	M, Own	S, 4	Own		Thermoid	452
453	Royal	4,200	Wisconsin	4	4½x6-32.4		Monarch	P	T, Kells		Stromberg		M, Bosch		P, Borg & B	I, 3	Own			453
454	Sandow, M	3,995	Continental, E4	4	4½x5½-32.4	S	Monarch	P	T, Chicago	Y	Stromberg	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 50	N	Spicer	454
455	Sanford, W35	4,050	Continental, E4	4	4½x5½-32.4	F	Pierce	P	T, Long	N	Stromberg	G	M, Bosch	N	P, Borg & B	S, 4	Brown-L, 50	N	Spicer	455
456	Schacht		Buda, YTU	4	4½x6-32.4	F	Duplex	P	T, Own	N	Schebler	G	M, Bosch	N	C, Own	S, 8	Own	N	M & E	456
457	Selden, 3½A		Continental, E7	4	4¼x5½-32.4	S	Pierce	P	T, Long	Y	Stromberg	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 50	N	Spicer	457
458	Service, 71	4,285	Buda, HU	4	4½x5½-28.9	F	Simplex	P	T, Long	N	Stromberg	G	M, Eisemann	N	P, Borg & B	S, 4	Brown-L, 60	N	Spicer	458
459	Service, 76	4,485	Buda, YU	4	4¼x6-32.4	F	Simplex	P	T, Long	N	Stromberg	G	M, Eisemann	N	P, Borg & B	S, 4	Brown-L, 60	N	Spicer	459
460	Signal, M	4,275	Continental, E4	4	4¼x5½-32.4	FS	Pierce	P	T, McCord	Y	Stromberg	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 50	N	Spicer	460
461	Standard, 66		Continental, E7	4	4½x5½-32.4	FS	Monarch	P	T, Long	N	Stromberg	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 50	N	Spicer	461
462	Sterling	4,550	Own	4	4¼x6½-32.4	F	Waukesha	P	C, Own	Y	Rayfield	G	M, Eisemann		M, M & E	I, 3	Own	N	Spicer	462
463	Stewart, 10	3,895	Continental, E7	4	4½x5½-32.4	FS	Pierce	P	T, Bush	N	Zenith	G	M, Eisemann	N	M, Fuller	S, 4	Fuller, GU4	Y	Hartford	463
464	Sullivan, H	4,650	Buda, YTU	4	4½x6-32.4	F	Pierce	P	T, Bush	Y	Stromberg	G	M, Bosch		M, Brown-L	S, 4	Brown-L, 50	N	Spicer	464
465	Super Truck, 70		Wisconsin, UAU	4	4¼x6-28.9	F	Simplex	P	T, Chicago	Y	Zenith	G	M, Bosch	N	M, Fuller	S, 4	Fuller, G	Y	Spicer	465
466	Tiffin, PW	4,175	Continental, E4	4	4½x5½-32.4	FS	Pierce	P	T, Own	Y	Schebler	G	M, Eisemann	N	P, Borg & B	S, 4	Fuller, G	Y	Peters	466
467	Titan	4,400	Buda, YTU	4	4½x6-32.4	F	Simplex	P	T, B & W	N	Stromberg	G	M, Eisemann	N	P, Borg & B	I, 4	Cotta, R	N	M & E	467
468	Tower, G	4,335	Continental, E4	4	4½x5½-32.4	S	Pierce	P	T, Own	N		G	M	N	M, Fuller	S, 4	Fuller, G	N		468
469	Twin City	4,750	Wisconsin, JAU	4	5½x6-42.0	F	Pierce	P	C		Stromberg		K-W		M, Hele-Shaw	I, 3	Cotta			469
470	United, C		Buda, HU	4	4¼x5½-28.9	F	Simplex	P	T, G & O		Stromberg		M, Bosch		M, Brown-L	S, 4	Brown-L, 35			470
471	Universal, L		Buda	4	4¼x5½-28.9		Monarch	P	T, Long		Zenith		M, Eisemann		M, Own	S, 3	Own			471
472	U. S., J	3,950	Continental, E4	4	4½x5½-32.4	FS	Pierce	P	T, Long		Stromberg		M, Eisemann		C, Hartford	S, 4	Brown-L, 60			472
473	Victor, M	3,800	Continental, E4	4	4½x5½-32.4	FS		P	Own		Stromberg		M, Bosch		M, Brown-L	S, 4	Brown-Lipe			473
474	Walter, MO3		Own	4	4¼x6-30.6	FS	Own	P	T, Own		Zenith		M, Swiss		C, Own	S, 4	Own			474
475	Ward LaFrance, 4A	4,490		4	4½x6½-32.4	F		P	T, Own	Y	Zenith	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 60	N	Spicer	475
476	Watson, 18		Continental, E4	4	4¼x5½-32.4	S	Pierce	P	T, R'e-T'r'n'y	N	Stromberg	G	M, Simms	N	M, Brown-L	S, 4	Brown-L, 50	N	Spicer	476
477	Wichita, O	3,750	Waukesha	4	4½x5½-32.4	FS	Waukesha	P	C, E & M		Stromberg		M, Berling		C, Hartford	S, 4	Brown-L, 50			477
478	Wilcox, D		Own	4	4¼x5-28.9	S	Pierce	P	T, Long	N	Stromberg	G	M, Bosch	N	C, Own	S, 4	Own	N		478
479	Wilson	3,950	Continental, E7	4	4½x5½-32.4	FS	Pierce	P	T, Own	N	Marvel	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 60	N	Hartford	479
480	Winther, 70	4,200	Wisconsin, TAU	4	4x6-25.6	F	N	P	T, Bremer	N	Master	G	M, Eisemann	N	P, Borg & B	S, 4	Brown-L, 50	N	Blood	480
	8,000 Pounds:																			
481	Bessemer, K2	4,285	Continental, E7	4	4½x5½-32.4	S	Pierce	P	C, Standard	Y	Rayfield	G	M, Bosch	N	P, Borg & B	S, 4	Brown-L, 60	N	Spicer	481
482	Gabriel, F	4,300	Buda, YU	4	4½x6-32.4	F	Duplex	P	T, G & O		Rayfield		M, Bosch		P, Borg & B	S, 4	Brown-L, 60			482
483	Highway-Knight, A		Moline-K., W	4	4x6-25.6	F		P	T, Own	N	Zenith	G	M, Eisemann	N	M, Brown-L	S, 4	Own	N	Thermoid	483
484	Jumbo, 40		Buda, YTU	4	4½x6-32.4	F	Duplex	P	T, Own	Y	Zenith	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 50	Y	Spicer	484
485	Kimball, E	4,975	Wisconsin, JU	4	5 1–10x5½-42.0	FS	Duplex	P	C, Flexo	N	Zenith	D	M, Berling	N	M, Brown-L	S, 4	Brown-L, 60	N	Spicer	485
486	Moreland, 19G	4,877	Cont'l Class B	4	4¾x6-36.0	F	Cont'l	P	T, Own	N	Miller	D	M, Dixie	N	M, Own	S, 4	Own	N	Thermoid	486
487	Noble, MW4	3,750	Continental	4	4½x5½-32.4	FS	Pierce	P	T, Chicago		Stromberg		M, Eisemann		P, Borg & B	S, 4	Fuller			487
488	Packard, 4E	4,550	Own	4	4½x5½-32.4	F	Own	P	T, Fedders	N	Own	G	M, Dixie	N	M, Own	S, 4	Own	N	Ther-Sp	488
489	Riker, BB		Own	4	4¼x6-28.9	S	Own	P	T	N	Ball & Ball	G	M, Berling	N	C, Own	S, 4	Own	N	Own	489
490	Union, H	3,500	Wisconsin, VAU	4	4¼x6-32.4	F	Duplex	P	T, Own	N	Schebler	G	M, Eisemann	N	M, Fuller	S, 4	Fuller, GU	N	Universal	490
	10,000 Pounds:																			
491	Acason, M	5,850	Waukesha, PU7	4	4¼x6½-36.1	F	Waukesha	P	C, National	Y	Stromberg	G	M, Eisemann	N	P, Borg & B	I, 3	Cotta, DU	Y	Blood	491
491a	Acme, E	5,150	Continental, B2	4	4¼x6-36.1	F	Cont'l	P	T, G & O	N	Rayfield	G	M, Eisemann	N	P, Borg & B	I, 4	Cotta, T	N	Blood	491a
491b	Atterbury, 8E	5,575	Continental, B2	4	4¼x6-36.1	FS	Cont'l	P	T, Own	Y	Zenith	G	B, M	Y	M, Brown-L	S, 4	Brown-L, 60	N	Spicer	491b

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TRUCK SPECIFICATIONS

7,000 (Hurlburt)—10,000 (Atterbury)

Line no.	Final drive (Bevel, Chain, Internal-gear, Spur-and-bevel, Worm) and make of rear axle and model number.	Hotchkiss drive? (Yes or No)	Differential (Bevel, Spur, Worm) and make.	Number and location of driving-wheels (Front, Rear).	Clearance under front and rear axles.	Service and emergency brakes (Contracting, Expanding).	Frame material (Pressed-steel, Rolled-steel) and make.	Front and rear springs (Cantaliver; 1-2, 3-4, or Full elliptic; Transverse).	Make of springs.	Leaves in front and rear springs.	Length and width of of front and rear springs.	Driver's position (Left, Right).	Make of steering gear.	Turning-circle diameter (feet and inches).	Wheels (Iron, Steel, Wood) and make.	Wheel-base (standard).	Front and rear tire sizes (dual, pneumatic).	Weight of chassis (pounds).	Perc. of weight on rear axle when empty & when loaded.	Line no.
426	W, Hindley			2, R		E, C	P, Savage	½, ½	Perfection				Ross		W, Wayne	156	36x5-36x5d			426
427	W, Sheldon, W31	N	B	2, R	11¼, 8¼	E, E	R	½, ½	Sheldon	9, 14	40x3-50x3½	L	Wohlrab	54, 0	I, Smith	160	36x5-36x5d	7,150	66, 75	427
428	I, Own		B	2, R		E	P	½, ½		10, 14	42½x3-57½x4	L	Ross		W	162	36x5-40x10	7,500	50, 68	428
429	B, Own			4, FR		E, C	P, Castle		Spring Perch			R	Ross		W, Standard	150	36x7-36x7			429
430	I, Clark, 3D	Y	B	2, R	11½, 12	C, E	P	½, ½	Perfection	11, 13	46x3-62x3½	L	Jacox	62, 6	S, Clark	165	36x5-36x10	6,400	50, 75	430
431	W, Sheldon, W30	N	W	2, R	10, 9½	E, E	R	½, ½	Sheldon	9, 13	42x2½-56x3½	L	Ross	36, 0	I, Smith	160	36x5-36x5d	7,300	—, 80	431
432	C, Own	N	B	2, R	11¼, 15½	E, E	P	½, ½	Perfection	11, 15	46¾x3-54x3	L	Gemmer	56, 0	W	150	36x5-36x5d	9,285	50, 90	432
433	I, Clark	N	B	2, R	9½, 13½	E, E	P	½, ½	Perfection	11, 14	48x3-56x4	L	Gemmer	56, 0	S	156	36x5-40x5d	8,500	50, 90	433
434	W, Standard	N	B	2, R	9½, 11	E, E	P	½, ½	Perfection	11, 14	48x3-56x4	L	Gemmer	56, 0	S	156	36x5-40x5d	8,500	50, 90	434
435	W, Sheldon, W30	Y	W	2, R	10¾, 8½	E, E	P, Smith	½, ½	Mather	11, 12	44x3-62x3½	L	Jacox	50, 0	I, Smith	168	36x5-35x5d	6,840	57½, 74½	435
436	W, Timken, 6652	Y	W	2, R	9½, 10	E, E	R, Own	½, ½	Betts	8, 14	44x3-52x3	R	Ross		W, W't'rh'se	163	36x5-36x10	7,200	50, 75	436
437	W, Timken, 6652	N	B	2, R	12½, 10½	E, E	R, Own	½, ½	Tuthill	8, 12	42x3-52x3½	L	Lavine	66, 4	S, Standard	156	36x5-40x5d	6,500		437
438	W, Sheldon, W30	Y	B	2, R	14, 9	E, E	P, Parish & B	½, ½	Merrill	10, 15	44x3-56x3½	L	Ross		W, Hoopes	160	36x5-36x5d	6,850	44, 88	438
439	W, Timken, 6652	N	B	2, R	9 5/16, 8¾	E, E	P, Parish	½, ½	Merrill	9, 14	42x2½-56x3½	L	Ross		S, Dayton	174	36x5-36x5d	6,175	—, 70	439
440	C, Own	N	B	2, R	11½, 10¾	C, E	P, Own	½, ½	Merrill	9, 10	46x3½-52x4	L	Own	52, 6	W, Own	156		8,070	46, 66	440
441	W, Sheldon, W31	Y	B	2, R	10, 8¾	E, E	R	½, ½	Sheldon	–, 15	46x3-56x4	L	Ross		W, Hayes	160	36x5-36x5d	7,000	50, 70	441
442	W, Timken, 6652	Y	B	2, R	11½, 10¾	E, E	P, Parish & B	½, ½	Detroit	12, 15	44x3-58x4	L	Ross	48, 0	S	158	36x5-40x5d	7,000	58, 72	442
443	W, Timken, 6652	N	B	2, R		E, E	R, Own	½, ½	Tuthill	11, 11	44x2½-54x3½	L	Gemmer		W, Standard	160	36x5-36x5d	6,650		443
444	W, Timken, 6560	N	W	2, R	9¾, 10¾	E, E	R	½, ½	Mather	9, 17	46x3-58x3½	L	Ross	54, 0	W, Hayes	158	36x5-40x5d	7,000		444
445	W, Timken, 6652	Y		2, R		E, E	R, Own	½, ½	Tuthill				Lavine		W, Prudden		36x5-36x5d			445
446	W, Sheldon, W30			2, R		E, E	P, Parish & B	½, ½	Tuthill				Lavine		W, Bimel	166	36x5-36x5d			446
447	W, Sheldon, W30	Y	B	2, R	10, 10¼	E, E	P	½, ½	Perfection	10, 12	44x3-56x4	L	Ross	50, 0	S, Clark	160	36x5-40x5d	7,300	51½, 73	447
448	W, Sheldon, W30	Y	W	2, R	11⅛, 8¾	E, E	R	½, ½	Sheldon	10, 16	48x3-60x4	R	Ross		W, St. Marys	160	36x5-36x5d	6,850	—, 77	448
449	W, Timken	N	B	2, R		E, E	P	½, ½	Perfection		46x3-58x4	L	Jacox		S, Dayton	160	36x5-36x5d	7,000	60, 40	449
450	W, Own	N	B	2, R	14, 11	C, E	P, Smith	½, ½	Tuthill	7, 16	44x3-60x3	L	Ross	64, 0	W, Bimel	160	36x5-40x5d	6,270	55, 76½	450
451	I, Torbensen, E1	Y	W, Powrlok	2, R		E, E	P, Detroit	½, ½	Mather	8, 13	44½x3-52¾x4	L	Jacox		I, Smith	165	36x5-36x10	6,400		451
452	W, Own	Y	B	2, R	9⅜, 9½	E	R, Standard	½, ½	Own		44x3-56x3½	L	Own		I, Smith	165	36x5-36x5			452
453	W, Timken			2, R		E, E	R, Own	½, ½	Merrill				Ross		W	158	36x5-38x5d			453
454	W, Timken, 6652	N	W	2, R	8¾, 8½	E, E	P, Savage	½, ½	Garden City	9, 17	44x3-56x3½	R	Ross	40, 0	W, Standard	175	36x5 36x5d	6,650	20, 70	454
455	W, Sheldon, W30	Y	B	2, R	10¾, 8¾	E, E	P	½, ½	Perfection	9, 13	46x3-54x3½	L	Ross	50, 0	W, Hoopes	174	36x5-36x5d	6,900	76, 87	455
456	W, Own	N	B	2, R	10½, 9	C, E	R, Own	½, ½	National	9, 15	35x2½-50x3	L	Own		W, St. Marys	168	36x5-36x5d	6,500	80, 80	456
457	W, Timken, 6652	N	B	2, R	9¾, 8 13/16	E, E	P, Parish & B	½, ½	Perfection	10, 14	42x3-56x3½	R	Gemmer	62, 0	W	162	36x5-36x10	7,200	56, 78	457
458	W, Timken, 6652	N	B	2, R	9¼, 7¾	E, E	P, Own	½, ½	Mather	11, 13	46x3-60x3½	L	Ross	52, 0	S	171	36x5-36x5d	6,950	—, 72	458
459	W, Timken, 6652	N	B	2, R	9¼, 7¾	E, E	P, Own	½, ½	Mather	11, 13	46x3-60x3½	L	Ross	52, 0	S	171	36x5-36x5d	7,280	—, 72	459
460	W, Timken, 6652	N	B	2, R	11, 11	E, E	P, Savage	½, ½	Detroit	11, 16	44x3-56x3½	L	Ross	61, 0	W, Hayes	168	36x5-40x10	7,070	—, 84	460
461	W, Timken, 6652	N	B	2, R	9½, 8½	E, E	P, Parish & B	½, ½	Perfection	10, 15	45¾x3-52½x3½	L	Gemmer		W	160	36x5-36x5d			461
462	W, Timken, 6652	N	W	2, R	12¼, 10 5/16	E, E	P, W	½c, ½c	Mather	8, 10	48x3-60x3½	L	Ross	53, 6	W, Prudden	162	36x5-40x5d	8,300	59, 92	462
463	I, Clark, 3D	Y	B	2, R	10, 10	C, C	P, Hydraulic	½, ½	Detroit	10, 14	41x2½-54x4	L	Ross	52, 0	S, Clark	165	36x5-36x5d	6,080	64½, 80½	463
464	W, Timken, 6652	N	B	2, R	9½, 8½	E, E	P	½, ½	Sheldon	9, 13	46x3-56x3½	L	Ross	58, 6	W, Wayne	170	36x5-36x5d	6,000	50, 68	464
465	W, Sheldon, W30	Y	B	2, R	12, 12¾	E, E	P	½, ½	Sheldon	10, 11	44x3-58x4	L	Ross	50, 0	S	164	36x5-40x5d	7,300		465
466	W, Sheldon, W31	N	B	2, R	10, 9	E, E	R	½, ½	Kalamazoo	9, 16	42x3-52x3½	L	Ross	62, 0	I, Smith	160	36x5-40x5d	6,950	40, 60	466
467	I, Clark, 3	N	B	2, R	12, 16	E, C	P, Parish & B	½, ½	Sheldon	9, 11	48x3-60x3½	L	Lavine	50, 0	S, Dayton	156	36x5-40x5d	7,350	57, 80	467
468	W, Timken	N	B	2, R	10½, 10½	E, E	P	½, ½	Detroit		44x3-56x3½	L	Ross		W	165	36x5-36x5d	6,800	—, 70	468
469	I			4, FR									Ross			140	36x6-36x6			469
470	I, Clark, 3D			2, R		E, C	P, Detroit	½, ½	Detroit				Lavine		S	157	36x5-36x5d			470
471	C, Own			2, R		E, E	R	½, ½	Kalamazoo				Lavine		W	156	36x5-36x5d			471
472	W, Sheldon, W30			2, R		E, E	R, Own	½, ½	Sheldon				Lavine		W, Schwarz	162	36x5-40x5d			472
473	W, Timken			2, R									Gemmer			176	36x6-36x5d			473
474	E, Own			4, FR		C, C	R, Own	½, ½					Own		S, Own	108	40x4d-40x4d			474
475	W, Timken, 6652	N	W	2, R	10¼, 8 5/16	E, E	P, Detroit	½, ½			46x3-60x3½	L	Ross		I, Smith	162	36x5-36x5d	7,750	—, 85	475
476	W, Empire, 12	Y	B	2, R	12½, 6½	E, E	P, Parish	½, ½	Sheldon	11, 12	44x3-56x3½	L	Gemmer		W, Crane	168	36x5-36x10	6,950		476
477	W, Sheldon, W30			2, R		E, E	P, Own	½, ½	Detroit				Ross		I, Smith	165	36x5-36x5d			477
478	W, Sheldon, W30	Y	B	2, R		E, E	P	½, ½	Own	10, 12	40x2½-60x4	L	Own		I, Smith	154	36x5-36x5d	6,400	25, 75	478
479	W, Timken, 6652	Y	B	2, R	9¾, 8½	E, E	R, Own	½, ½	Perfection	11, 17	46x3-60x3½	L	Ross		W	160	36x5-36x5d	6,800	60, 80	479
480	I, Clark, 3D	Y	B	2, R	11½, 12	C, E	R, Own	½, ½	Mather	8, 10	46x3-56x4	R	Ross	62, 0	S, Clark	150	36x5-36x5d	6,400	45, 80	480
481	I, Torbensen, E	N	B	2, R	11, 11	E, C	P	½, ½	Perfection	10, 12	44x3-56x3½	L	Ross		W, Schwarz	175	36x5-36x10	6,700	54, 69	481
482	W, Timken, 6652			2, R		E, E	P, Parish	½, ½	Merrill				Gemmer		I, Smith	180	36x5-40x5d			482
483	W	Y		2, R	11, 10	E, E	P	½, ½	Sheldon		46x3-56x3½	L			W, Schwarz	159	36x5-36x6d	7,200		493
484	I, Clark, 3D	Y	B	2, R	13¼, 16¾	C, E	P	½, ½	Perfection	10, 13	46x3-62x3½	L	Jacox	62, 6	S, Clark	165	38x7p-44x10p	6,800	50, 75	484
485	W, Sheldon, W30	Y	B	2, R		E, E	P	½, ½	U. S.	12, 16	45½x3-53½x3½	L	Ross	39, 6	I, Smith		36x5-40x10		50, 80	485
486	W, Timken, 6652	N	W	2, R	9½, 11½	E, E	P	½, ½	U. S.	9, 12	50x3-50x4	L	Ross		I, Smith	162	36x5-40x5	7,800	55, 67	486
487	W, Sheldon			2, R		E, E	R	½, ½	Kalamazoo				Lavine		S	168	36x5-36x5d			487
488	W, Own	N	S	2, R	10½, 10½	C, E	R, Own	½, ½		11, 14	42¾x3-46x3	L	Own	56, 0	W	156	36x5-40x5d	7,460	55, 75	488
489	W, Own	N	B	2, R	12, 9	C, E	P	½, ½		9, 17	42x3-54x3	R	Ross	55, 0	S	150	36x5-36x6d	7,200	63, 77	489
490	I, Torbensen, E	Y	B	2, R	13, 12	C, C	P, Own	½, ½	Mather	8, 15	42x3-56x4	L	Ross		S, Dayton	171	36x6-36x10		50, 70	490
491	W, Timken, 6752	Y	B	2, R	11, 10	E, E	P, Savage	½, ½		11, 16	40x3-50x4	R	Ross		I, Smith	187	36x6-40x6d	8,350	—, 77	491
491a	W, Timken, 6760	N	B	2, R	9, 9½	E, E	P	½, ½	Detroit	11, 17	44x3-56x4	L	Ross	58, 0	I, Smith	180	36x6-40x6d	8,800	57, 80	491a
491b	W, Timken, 6752	N	B	2, R		E, E	P	½, ½	Spring Perch	10, 12	41½x3-54x4	L	Gemmer	59, 10	S, Dayton	167½	36x5-40x6	9,350		491b

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10,000 (Autohorse)—12,000 INTERNAL-COMBUSTION

Line no.	Brand name and model name or number	Price f. o. b. factory with seat and tires but without body.	Make of engine and model number.	Number of cylinders.	Bore and stroke, and N. A. C. C. horse-power.	Lubrication (Forced-feed, Splash).	Make of gov-ernor (None).	Water-circulation (Pump, Thermo-siphon).	Radiator (Cellular, Tubular) and make.	Radiator guard included in price? (Yes or No)	Make of carbu-reter.	Fuels (Distillate, Gasolene, Kerosene).	Ignition (Battery, Magneto) and make of magneto.	Electric starting and lighting included in price? (Yes or No)	Clutch (Cone, Multiple-disk, Plate) and make.	Transmission (Individual-clutch, Planetary, Sliding-gear) and number of forward speeds.	Make of transmission and model number.	Power take-off included in price? (Yes or No)	Make of univer-sal joints.	Line no.
	10,000 Pounds—Con.																			
492	Autohorse, 10	2,000	Continental	4	3½x5-22.5		N	P	C, Eureka		Stromberg		M, Eisemann	N	P, Borg & B	S, 3	Detroit			492
493	Available, H5	5,575	Continental, B2	4	4½x6-36.1	FS	Cont'l	P	T, Chicago	Y	Zenith	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 60	N	Spicer-B'd	493
494	A & B, 5T		Own	4	5½x3½-42.8		N	P	T, Bush		Schebler		M, Bosch		M, Brown-L	S, 4	Brown-Lipe			494
495	Bollstrom, A		Own	4	4½x5½-28.9			P	Own		Stromberg		M, Bosch		M	I, 4	Own		Own	495
496	Brookway, T	5,000	Continental, B2	4	4½x6-36.1	F	Cont'l	P	T, G & O	Y	Stromberg	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 60	N	Spicer	496
497	Clydesdale, 120B	4,975	Continental, B2	4	4½x6-36.1	F	Own	P	T, Own	Y	Stromberg	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 60	N	Spicer	497
498	Couple-Gear, AC	6,700	Wisconsin	4	5½x7-44.1	FS	N	P	C, Ideal	Y	Stromberg	G	BM, E'sm'nn.	N	†	†, 6	Own		Own	498
499	Day-Elder, E	4,500	Buda	4	4½x6-32.4		Monarch	P	T, Bush		Zenith		M, Berling		M, Brown-L	S, 4	Brown-Lipe		Hartford	499
500	Denby, 210	4,900	Continental, E7	4	4½x5½-32.4	F	Monarch	P	T, Long	Y	Stromberg	G	M, Eisemann	N	M, Own	S, 4	Warner, T53	N	Peters	500
501	Diamond T, 8	5,785	Class B, U. S	4	4½x6-36.1	FS	Pierce	P	T, G & O	N	Stromberg	G	M, Bosch	N	M, Brown-L	S, 4	Brown-Lipe		Spicer	501
502	Fageol	5,300	Waukesha, DU	4	4½x6½-32.4	S	Waukesha	P	C, Modine	N	Zenith	DG	M, Dixie	N	M, Brown-L	S, 5	Own	Y	Spicer	502
503	Federal, XC	4,550	Continental, E4	4	4½x5½-32.4	FS	Pharo	P	T, McCord	Y	Zenith	G	M, Eisemann	N	P, Borg & B	S, 4	Warner, WXD	N	Spicer	503
504	Garford, 6S	5,000		4	4½x5½-36.1	F	Simplex	P	T, Own	N	Rayfield	G	M, Splitdorf	N	M	S, 4		N		504
505	Gary, M	4,850	Buda, BTU	4	5x6½-40.0	F	McCanna	P	T, Chicago	Y	Master	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 60	N	Spicer	505
506	GMC, 101A	4,550	Continental, E4	4	4½x5½-32.4	FS	Monarch	P	T, Own	N	Marvel	G	M, Eisemann	N	M, Own	S, 4	Own	N	Own	506
507	Gramm-Bernstein, 50	5,500	Continental, B2	4	4½x6-36.1	F		P	T, Own	Y	Stromberg	G	M, Eisemann	N	M, Own	I, 4	Own	N	Own	507
508	Hall	4,850	Continental, E4	4	4½x5½-32.4	FS	Simplex	P	T, Long	Y	Zenith	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 60	N	Spicer	508
509	Hall	4,850	Continental, E4	4	4½x5½-32.4	FS	Simplex	P	T, G & O	Y	Zenith	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 50	N	Hartford	509
510	Harvey, WKA	5,200	Buda	4	4½x6-32.4	F	Duplex	P	T, Chicago		Stromberg		M, Eisemann		P, Borg & B	S, 4	Brown-Lipe			510
511	Highway-Knight, B		Moline-K., W	4	4x6-25.6	F		P	T, Own	N	Zenith	G	M, Eisemann	Y	M, Brown-L	S, 4	Own	N	Thermoid	511
512	Hurlburt, D	5,250	Buda, YTU	4	4½x6-32.4	FS	Duplex	P	T, Own		Flechter		M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 60			512
513	Indiana, 50	4,600	Waukesha, PU7	4	4½x6½-36.1	F	Pierce	P	T, Long	Y	Stromberg	G	M, Eisemann	N	P, Borg & B	S, 4	Brown-L, 60	N	Spicer	513
514	Kelly-Springfield, K50	5,150	Own	4	4½x6½-32.4	F	Pierce	P	C, Long	N	Zenith	G	M, Eisemann	N	C, Own	S, 3	Covert, F	N	Own	514
515	Kimball, F	5,975	Wisconsin, JAU	4	5½x6-42.0	FS	Duplex	P	C, Flexo	N	Zenith	D	M, Berling	N	M, Brown-L	S, 4	Brown-L, 60	N	Spicer	515
516	Kissel, Goliath	4,785	Own	4	4½x5½-28.9	S	Pierce	P	T, Fedders	N	Stromberg	G	M, Eisemann	N	M, Warner	S, 4	Warner, T53	N	Spicer	516
517	Kleiber, D	5,300	Continental, T	4	5½x5½-44.1	S	Pierce	P	T, R'e-T'rn'y	N	Stromberg	G	M, Bosch	N	M, Hele-Shaw	S, 4	Brown-L, 60-4	N	Spicer	517
518	Larrabee, T		Continental, E4	4	4½x5½-32.4	S	Simplex	P	T, Bush	N	Schebler	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 60	N	Spicer	518
519	Mack, AC		Own	4	5x6-40.0	S	Own	P	T, Own	N	Zenith	G	M, Dixie	N	P, Own	S, 3	Own	Y	Spicer	519
520	Mapleleaf, DD		Hinkley, HA1600	4	4½x5½-32.4	FS	Hinkley	P	T, McCord	Y	Stromberg	G	M, Bosch	N	M, Fuller	S, 4	Fuller, H	N	Blood	520
521	Master, B	5,290	Buda, ATU	4	4½x6½-36.1	F	Pierce	P	T, Own	N	Master	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 60	Y	Spicer	521
522	Menominee, J		Wisconsin, A	4	4½x5½-36.1	S		P	T, Own	N	Stromberg	G	M, Eisemann	N	P, Borg & B	S, 4	Brown-L, 60	N	Spicer	522
523	Moreland, 10J	5,350	Cont'l, Class B	4	4½x6-36.1	F	Cont'l	P	T, Own	N	Miller	D	M, Dixie	N	M, Own	S, 4	Own	N	Thermoid	523
524	National, JA		Waukesha, PU7	4	4½x6½-36.1	S	Waukesha	P	C, McKinnon	Y	Zenith	G	M, Eisemann	N	M, Hele-Shaw	S, 4	Brown-L, 60	N	Spicer	524
525	Nelson & LeMoon, F5		Continental, B2	4	4½x6-36.1	F	Pierce	P	T, Chicago		Stromberg		M, Bosch		M, Brown-L	S, 4	Brown-L, 60		Thermoid	525
526	Old Reliable, D	5,000	Wisconsin, J	4	5 1-10x5½-42.0	F	Monarch	P	T, Chicago	Y	Stromberg	G	M, Bosch	N	M, Universal	S, 4	Savage, SD60	Y	Spicer	526
527	Packard, 5E	5,450	Own	4	5x5½-40.0	F	Own	P	T, Fedders	N	Own	G	M, Dixie	N	M, Own	S, 4	Own	N	Ther-Sp	527
528	Parker, M9	5,225	Wisconsin, RAU	4	4½x6-36.1	F	Monarch	P	T, Own	Y	Stromberg	G	M, Bosch	Y	M, Brown-L	S, 4	Warner, T53-1	N	Kinsler-B	528
529	Parker, M9	5,500	Continental, B2	4	4½x6-36.1	F		P	T, Bremer	Y	Stromberg	G	M, Bosch	Y	M, Brown-L	S, 4	Warner, T53	N	Kinsler-B	529
530	Pierce-Arrow, R9	5,500	Own	4	4½x6-38.0	F	Own	P	T, Own	N	Stromberg	G	M, Dixie	N	C, Own	S, 3	Own	Y	Own	530
531	Reynolds, 10A	5,350	Own	4	4½x5½-32.4	F	Hinkley	P	T, Own	Y	Stromberg	dgk	M, Teagle	Y	M, Own	S, 4	Own		Thermoid	531
532	Rowe, FW	4,900	Wisconsin, AU	4	4½x5½-36.1	F	Simplex	P	C, Mayo		Zenith		M, Bosch		M, Brown-L	S, 4	Brown-L, 60			532
533	Royal	5,000	Wisconsin	4	4½x5½-36.1		Monarch	P	T, Kells		Stromberg		M, Bosch		M, Hele-Shaw	I, 3	Own			533
534	Sandow, L	4,775	Continental, E4	4	4½x5½-32.4	S	Monarch	P	T, Chicago	Y	Stromberg	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 60	N	Spicer	534
535	Sanford, W50	4,950	Continental, E4	4	4½x5½-32.4	F	Pierce	P	T, Long	N	Stromberg	G	M, Bosch	N	P, Borg & B	S, 4	Brown-L, 60	N	Spicer	535
536	Schacht		Buda, YTU	4	4½x6-32.4	F	Duplex	P	T, Own	N	Schebler	G	M, Bosch	N	C, Own	S, 8	Own	N	M & E	536
537	Schwarts, D	4,500	Buda, YTU	4	4½x6-32.4	F	Simplex	P	C, Fedders	Y	Stromberg	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 60	N	M & E	537
538	Selden, 5A		Continental, B2	4	4½x6-36.1	F	Cont'l	P	T, Long	Y	Stromberg	G	M, Eisemann	N	M, Detlaff	S, 4	Brown-L, 60	Y	Spicer	538
539	Service, 101	5,275	Buda, YU	4	4½x6-32.4	F	Simplex	P	T, Long	N	Stromberg	G	M, Eisemann	N	P, Borg & B	S, 4	Brown-L, 60	N	Spicer	539
540	Signal, R	5,300	Continental, B2	4	4½x6-361	FS	Pierce	P	T, McCord	Y	Stromberg	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 60	N	Spicer	540
541	Standard, 86		Continental, E7	4	4½x5½-32.4	FS	Monarch	P	T, Long	N	Stromberg	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 60	N	Spicer	541
542	Sterling	5,600	Own	4	5x6½-40.0	F	Waukesha	P	C, Own	Y	Rayfield	G	M, Eisemann		M, M & E	I, 6	Own	N	Universal	542
543	Sterling	5,350	Own	4	5x6½-40.0	F	Waukesha	P	C, Own	Y	Rayfield	G	M, Eisemann		M, M & E	I, 3	Own	N	Spicer	543
544	Super Truck, 100		Wisconsin, RAU	4	4½x6-36.1	F	Simplex	P	T, Chicago	Y	Zenith	G	M, Bosch	N	M, Hilliard	S, 4	Savage, SD60	Y	Spicer	544
545	Tiffin, TW	5,250	Continental, B2	4	4½x6-36.1	FS	Cont'l	P	T, Own	Y	Schebler	G	M, Eisemann	N	P, Borg & B	I, 4	Cotta, S	Y	Peters	545
546	Titan	5,400	Buda, YTU	4	4½x6-32.4	F	Simplex	P	T, B & W	N	Stromberg	G	M, Eisemann	N	P, Borg & B	I, 4	Cotta, S	N	M & E	546
547	United, V		Buda, YU	4	4½x6-32.4	F	Simplex	P	T, G & O		Stromberg		M, Bosch		M, Brown-L	S, 4	Brown-L, 60			547
548	U. S., K	4,850	Waukesha, P	4	4½x6½-36.1	F	Waukesha	P	T, Long		Stromberg		M, Eisemann		P, Borg & B	S, 4	Brown-L, 60			548
549	Walter, (N. Y.), S	5,500	Waukesha, DU	4	4½x6½-32.4	F	Own	P	T, Bush	Y	Stromberg	G	M, Simms	Y	M, Brown-L	S, 4	Warner, T53		M & E	549
550	Ward LaFrance, 5A	5,490		4	5x6½-40.0	F		P	T, Own	Y	Zenith	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 60	N	Spicer	550
551	White, 45	5,000	Own	4	4½x5½-28.9	F	Own	P	T, Own	N	Own	G	M		P, Own	S, 4	Own	N	Own	551
552	Wilcox, W		Waukesha, P	4	4½x6½-36.1	S	Waukesha	P	T, Long	N	Stromberg	G	M, Bosch	N	C, Own	S, 4	Own	N		552
553	Wilson	4,800	Continental, E7	4	4½x5½-32.4	FS	Pierce	P	T, Own	N	Marvel	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 60	N	Hartford	553
554	Winther, 109	5,250	Wisconsin, VAU	4	4½x6-32.4	F	Duplex	P	T, Bremer	N	Master	G	M, Eisemann	N	P, Borg & B	S, 4	Brown-L, 60	N	Blood	554
	11,000 Pounds:																			
555	Maccar, G	5,250	Continental, B2	4	4½x6-36.1	F	Cont'l	P	T, Own	N	Zenith	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 60	N	Spicer	555
	12,000 Pounds:																			
556	Doane	5,350	Waukesha, PU7	4	4½x6½-36.1	S	Waukesha	P	C, Own		Master		M, Bosch		M, Brown-L	S, 3				556
557	Kelly-Springfield, K60	5,500	Own	4	4½x—32.4	F	Pierce	P	C, Long	N	Zenith	G	M, Eisemann	N	C, Own	S, 3	Covert, F	N	Own	557
558	Packard, 6E	5,700	Own	4	5x5½-40.0	F	Own	P	T, Fedders	N	Own	G	M, Dixie	N	M, Own	S, 4	Own	N	Ther-Sp	558
559	Royal	5,400	Wisconsin	4	5½x6-42.0		Monarch	P	T, Kells		Stromberg		M, Bosch		M, Hele-Shaw	I, 3	Own			559
560	Tiffin, UW	5,450	Continental, B2	4	4½x6-36.1	FS	Cont'l	P	T, Own	Y	Schebler	G	M, Eisemann	N	P, Borg & B	I, 4	Cotta, S	Y	Peters	560
561	United, T		Buda, HU	4	4½x5½-28.9	F	Simplex	P	T, G & O		Stromberg		M, Bosch		M, Brown-L	S, 4	Muncie, 63			561
562	Wichita, 8	5,400	Beaver, JAB	4	4½x6-32.4	FS	Duplex	P	C, E & M		Stromberg		M, Bosch		C, Hartford	S, 4	Own			562

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TRUCK SPECIFICATIONS

10,000 (Autohorse)—12,000

Line no.	Final drive (Bevel, Chain, Internal-gear, Spur-and-bevel, Worm) and make of rear axle and model number.	Hotchkiss drive? (Yes or No)	Differential (Bevel, Spur, Worm) and make.	Number and location of driving-wheels (Front, Rear).	Clearance under front and rear axles.	Service and emergency brakes (Contracting, Expanding).	Frame material (Pressed-steel, Rolled-steel) and make.	Front and rear springs (Cantaliver; 1-2, 3-4, or Full elliptic; Transverse).	Make of springs.	Leaves in front and rear springs.	Length and width of front and rear springs.	Driver's position (Left, Right).	Make of steering gear.	Turning-circle diameter (feet and inches).	Wheels (Iron, Steel, Wood) and make.	Wheel-base (standard).	Front and rear tire sizes (dual, pneumatic).	Weight of chassis (pounds).	Perc. of weight on rear axle when empty & when loaded.	Line no.
492	I, Own			1, F		C, E	R, Own		Champion				Own		W, Bimel	43	34x10			492
493	W, Timken, 6752	N	W	2, R	9, 10	E, E	R, Own	½, ½	Tuthill	10, 15	44x3-60x4	L	Ross		I, Smith	190	36x6-40x6d	8,900	55, 75	493
494	I, Own			2, R		C, C	R, Own	½, ½	Perfection				Gemmer		W	144	48x3½d-48x5d			494
495	I, Own			2, R		C, C	R, Own					L	Gemmer		S, Clark	144	36x6-36x6			495
496	W, Timken, 6752	N	B	2, R		E, E	P, Parish & B	½, ½	Merrill	12, 17	44x3-58x4	L	Gemmer		I, Smith	174	36x6-40x6d	9,075	60, 90	496
497	W, Timken, 6752	N	B	2, R	13¾, 9¾	E, E	P, Parish & B	½, ½	Perfection	11, 18	44x3-56x4	L	Ross		I, Smith	204	36x6-40x12	8,500	65, 76	497
498	B, Own	N		4, FR	11, 11	E, E	R	½, ½	Tuthill	12, 12	43x3-43x3	R	Own	36, 0	S, Own	144	36x5-36x5	11,000	50, 50	498
499	W, Sheldon			2, R		E, E	P, Savage		Iron City			L	Ross		W, Jones	150	36x5-40x6d			499
500	I, Clark, W100	Y	B	2, R	13¾, 13¾	E, E	P, Detroit	½, ½	Detroit	10, 18	42x3-54x4	L	Gemmer	62, 0	S, Russell	170	36x6-40x12	8,590	58, 80	500
501	W, Timken	Y	W	2, R		E, E	P	½, ½	Mather	10, 14	46x3-56x4	L	Gemmer		I, Smith	180	38x6-40x6d	8,790	50, 90	501
502	W, Timken, 6752	N	B	2, R	14½, 10½	E, E	P, Own	½, ½	Mather	9, 16	46x3-60x4	L	Ross	59, 8	W, Prudden	172	36x6-40x6d	8,300	56, 73	502
503	W, Timken, 6752	N	B	2, R	9, 10	E, E	R	½, ½	Mather	8, 16	44x3-56x3½	L	Gemmer	57, 0	I, Smith	156	36x6-40x6d	8,100	65, 78	503
504	C	N	B	2, R		C, E	P	½, ½		10, 17	48x3-50x3	R			I. p	128	36x6-40x6d	8,870		504
505	W, Timken, 6752	Y	W	2, R	9, 10½	E, E	P	½, ½	Detroit	13, 18	46x3-60x4	L	Ross	52, 0	S, Dayton	182	36x6-40x6d	8,500	50, 20	505
506	W, Timken, 6752	N	B	2, R	11½, 10	E, E	R, Own	½, ½	Detroit	10, 16	44x3-54x4	L	Jacox	55, 0	Own	163	36x6-40x6d	8,000	56, 75	506
507	W, Standard	Y	B	2, R	12½, 10½	E, E	P, Own	½, ½	Perfection	10, 16	48x3½-64x4	L	Ross	62, 0	I, Smith	168	36x6-40x6d	9,500	76½, 92½	507
508	W, Timken, 6752	Y	W	2, R	8, 9	E, E	R	½, ½	Perfection	12 18	45x3-52x4	L	Gemmer		I, Smith	144	36x5-40x6	8,400	25, 80	508
509	C, Timken, 4800	Y	W	2, R	8, 16	E, E	R	½, ½	Detroit	12, 18	45x3-52x3½	L	Gemmer		I, Smith	144	36x5-40x6	7,530	25, 80	509
510	W, Sheldon			2, R		E, E	R, Own	½, ½	Sheldon				Ross		I, Smith	160	36x6-40x6d			510
511	W	Y	, R	11, 10½		E, E	P	½, ½	Sheldon		46x3-58x4	L			W, Schwarz	159	36x5-40x6d	8,400		511
512	W, Hindley			2, R		E, C	P, Savage	½, ½	Perfection				Ross		W, Wayne	170	36x5-40x6d			512
513	W, Sheldon, W50	N	B	2, R	9½, 10½	E, E	R, Illinois	F, ½	Sheldon	10, 15	40x3-50x4	L	Wohlrab	56, 0	I, Smith	167	36x5-40x6d	8,730	66½, 78½	513
514	C, Own	N	B	2, R	11½, 15½	E, E	P	½, ½	Perfection	11, 14	46¾x3-56¾x3¾	L	Gemmer	56, 0	W	150	36x6-40x6d	9,175	50, 90	514
515	W, Sheldon, W50	Y	B	2, R		E, E	P	½, ½	U. S	12, 16	45½x3-53½x4	L	Ross	39, 6	I, Smith		36x6-40x12		50, 80	515
516	W, Sheldon, W30	Y	W	2, R	10, 8	E, E	P, Smith	½, ½	Mather	11, 13	44x3-62x3½	L	Jacox	50, 0	I, Smith	180	36x6-36x6d	7,000	57½, 74½	516
517	W, Timken, 6752	N	W	2, R	9½, 10½	E, E	R, Own	½, ½	Betts	11, 15	50x3-52x4	R	Ross		I, Smith	180	36x6-40x12	9,200	50, 75	517
518	W, Sheldon, W50	Y	B	2, R	14, 10½	E, E	P, Savage	½, ½	Merrill	12, 17	44x3-58x4	L	Ross		I, Smith	178	36x6-40x6d	8,500	40, 84	518
519	C, Own	N	B	2, R	11½, 10¾	C, E	P, Own	½, ½	Merrill	9, 13	46x3½-52x4	L	Own	52, 6	W, Own	168		8,650	48, 90	519
520	W, Sheldon, W51	Y	B	2, R	10¼, 10½	E, E	R	½, ½	Sheldon	–, 13	46x2-56x4	L	Ross		I, Smith	160	36x6-40x6d	8,000	60, 70	520
521	W, Timken, 6752	Y	B	2, R	11, 11¼	E, E	P, Parish & B	½, ½	Detroit	13, 18	46x3-60x4	L	Ross	50, 0	I, Smith	170	36x6-40x6d	8,000	58, 72	521
522	W, Timken, 6752	N	B	2, R		E, E	R, Own	½, ½	Tuthill	9, 12	44x3-54x4	L	Gemmer		W, Standard	160	36x6-40x6d	8,500		522
523	W, Timken, 6752	N	W	2, R	9, 10	E, E	P	½, ½	U. S	12, 14		L	Ross		I, Smith	162	36x6-40x6	9,400	55, 67	523
524	W, Timken, 6760	N	W	2, R	9, 10½	E, E	R	½, ½	Mather	11, 19	44x3½-60x4	L	Ross	56, 0	W, Hayes	170	36x6-40x6d	8,650		524
525	W, Timken, 6752	Y		2, R		E, E	R, Own	½, ½	Tuthill				Lavine		W, Prudden		36x6-40x6d			525
526	W, Sheldon, W50	Y	W	2, R	10¼, 10½	E, E	R	½, ½	Sheldon	10, 16	48x3-60x4	R	Ross		W, St. Marys	168	36x6-40x6d	8,400	—, 70	526
527	W, Own	N	S	2, R	11⅞, 9½	C, E	R, Own	½, ½		12, 13	42⅞x3-54x3½	L	Own	62, 0	S	156	36x6-40x6d	8,650	57, 76	527
528	W, Own	N	B	2, R	14½, 11	C, E	P, Smith	½, ½	Tuthill	9, 14	44x3-60x4	L	Ross	60, 0	W, Bimel	160	36x6-40x6d	8,580	58½, 78	528
529	W, Timken, 6752	N	B	2, R	14¼, 10½	C, E	P	½, ½	Tuthill	9, 14	43x3-60x4	L	Ross	60, 0		160	36x6-40x6d	8,580	59, 78	529
530	W, Own	N	W	2, R	12, 10½	C, E	P, Own	½, ½	Spring Perch	11, 16	33x2½-48x3	R	Own	50, 6	W, Own	168	36x5-40x6d	8,450	63 75	530
531	W, Own	Y	B	2, R	9⅜, 10½	E, E	R, Standard	½, ½	Own		44x3-56x4	L	Own		I, Smith	165	36x6-40x6			531
532	W, Sheldon, W50			2, R		E, E	R, Own	½, ½	Sheldon				Ross			171	36x6-40x6d			532
533	W, Timken			2, R		E, E	R, Own	½, ½	Merrill				Ross		W	168	36x6-40x6d			533
534	W, Timken, 6752	N	W	2, R	8½, 8	E, E	P, Savage	½, ½	Garden City	10, 20	44x3-56x3½	R	Ross	41, 0	W, Standard	175	36x6-40x6d	7,950	20, 70	534
535	W, Sheldon, W50	Y	B	2, R	10½, 10½	E, E	P	½, ½	Perfection	10, 13	46x3-54x3½	L	Ross	58, 0	I, Smith	174	36x5-40x6d	7,600	80, 87	535
536	W, Own	N	B	2, R	10, 9	C, E	R, Own	½, ½	National	9, 17	35x3-50x3	L	Own		W, St. Marys	168	36x5-40x6d	8,500	80, 80	536
537	I, Torbensen, EI	Y	B	2, R	9½, 11¾	E, C	P, Parish	½, ½	Rowland	10, 15	40x3-56x4	L	Ross		I, Smith	170	36x6-36x10	7,600		537
538	W, Timken, 6752	N	B	2, R	–, 10¼	E, E	P, Parish & B	½, ½	Perfection	11, 15	46x3½-60x4	L	Gemmer	62, 0	S	164	36x6-40x12	9,700	57, 76	538
539	W, Timken, 6752	N	B	2, R	9, 10⅜	E, E	P, Own	½, ½	Mather	12, 15	46x3-60x3½	L	Ross	56, 0		171½	36x6-40x6d	8,760	—, 75	539
540	W, Timken, 6752	N	B	2, R	11, 11	E, E	P, Savage	½, ½	Detroit	11, 18	44x3-56x5	L	Ross	71, 0	I, Smith	180	36x6-40x12	9,510	—, 84	540
541	W, Timken, 6752	N	B	2, R	9, 10	E, E	P, Parish & B	½, ½	Perfection		45½x3-52½x4	L	Gemmer		S, Dayton	160	36x6-40x6d			541
542	C, Own	N	S	2, R	11, —	E, C	P	½c, ½c	Mather	10, 12	48x3-60x4	L	Ross	47, 9	I, Smith	174	36x6-40x6d	10,000	59, 91	542
543	W, Timken, 6752	N	W	2, R	11, 9⅜	E, E	P	½c, ½c	Mather	10, 12	48x3-60x4	L	Ross	47, 2	W, Prudden	168	36x6-40x6d	9,700	58, 92	543
544	W, Sheldon, W51	N	B	2, R	11½, 12	E, E	P	½, ½	Sheldon	11, 13	44x3-58x4	L	Ross	50, 0	S	164	36x5-40x6d	8,500		544
545	W, Sheldon, W51	N	B	2, R	9, 10	E, E	R	½, ½	Kalamazoo	10 16	42x3½-53x4	L	Ross	69, 0	I, Smith	168	36x6-40x6d	8,000	40, 60	545
546	I, Clark, 5	N	B	2, R	12, 16	E, C	P, Parish & B	½, ½	Sheldon	9, 13	48x3-60x3½	L	Lavine	50, 0	S, Clark	156	36x5-40x6d	9,100	57, 80	546
547	I, Clark, 5D			2, R		E, C	P, Detroit	½, ½	Detroit				Ross		S	160	36x5-40x6d			547
548	W, Sheldon, W50			2, R		E, E	R, Own	½, ½	Sheldon				Lavine		S, Dayton	168	36x5-40x6d			548
549	I, Own	Y	W	2, R	14, 14	C, C	P	½, ½	Perfection		48x3-52x5	L	Ross	48, 0	S, Dayton	168	36x6-40x6d	8,000	50, 80	549
550	W, Timken, 6752	N	W	2, R	9¾, 10 5/16	E, E	P, Detroit	½, ½			50x3-60x4	L	Ross		I, Smith	190	36x6-40x6d	9,300	—, 85	550
551	I, Own	N	BS	2, R	10¼, 10¼	C, E	R	½, ½				L	Own	61, 0	S	174	36x6-40x6d	7,925	54, 70	551
552	W, Sheldon, W50	N	B	2, R		E, E	P	½, ½	Sheldon	12, 13	48x3½-62x5	L	Own		I, Smith	162	36x5-40x6d	9,100	25, 75	552
553	W, Timken, 6752	Y	B	2, R	9, 10½	E, E	R, Own	½, ½	Perfection	11, 17	46x3-60x4	L	Ross		W	160	36x6-40x6d	7,500	60, 80	553
554	I, Clark, 5D	Y	B	2, R	11, 14	E, E	R, Own	½, ½	Mather	8, 12	46x3-56x4	R	Ross	68, 0	S, Clark	162	36x5-40x6d	8,600	45, 80	554
555	W, Timken, 6752	N	B	2, R	9, 10¼	E, E	P, Parish	½, ½	Merrill	11, 15	42x2½-56x4	L	Ross		S, Dayton	186	36x5-40x6d	8,750	—, 70	555
556	C, Own			2, R			R	½, ½					Lavine		S, West	178	36x6-40x6d			556
557	C, Own	N	B	2, R	11½, 15½	E, E	P	½, ½	Perfection	12, 15	48½x3-56½x3½	L	Gemmer	56, 0	W	150	36x6-40x7d	9,500	50, 90	557
558	W, Own	N	S	2, R	11⅜, 9½	C, E	R	½, ½		12, 14	42½x3-54x3½	L	Own	62, 0	S	156	36x6-40x7d	8,925	58, 78	558
559	W, Timken			2, R		E, E	R, Own	½, ½	Merrill				Ross		W	168	36x6-40x6d			559
560	W, Sheldon, W51	N	B	2, R	9, 10	E, E	R	½, ½	Kalamazoo	10, 18	42x3½-52x4	L	Ross	34, 6	I, Smith	168	36x6-40x12	9,000	40, 60	560
561	I, Torbensen, C			2, R		E, C	R, Detroit	½, C	Detroit				Jacox		S		34x3½-34x7			561
562	B, Own			2, R		E, E	P, Savage	½, ½	Detroit				Ross		I, Smith	165	38x6-40x6d			562

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10,000 (Autohorse)—12,000 INTERNAL-COMBUSTION

Line no.	Brand name and model name or number	Price f. o. b. factory with seat and tires but without body.	Make of engine and model number.	Number of cylinders.	Bore and stroke, and N. A. C. C. horse-power.	Lubrication (Forced-feed, Splash).	Make of gov-ernor (None).	Water-circulation (Pump, Thermo-siphon).	Radiator (Cellular, Tubular) and make.	Radiator guard included in price? (Yes or No)	Make of carbu-reter.	Fuels (Distillate, Gasolene, Kerosene).	Ignition (Battery, Magneto) and make of magneto.	Electric starting and lighting included in price? (Yes or No)	Clutch (Cone, Multiple-disk, Plate) and make.	Transmission (Individual-clutch, Planetary, Sliding-gear) and number of forward speeds.	Make of transmission and model number.	Power take-off included in price? (Yes or No)	Make of univer-sal joints.	Line no.
	10,000 Pounds—Con.																			
492	Autoborse, 10	2,000	Continental	4	3½x5-22.5		N	P	C, Eureka		Stromberg		M, Eisemann	N	P, Borg & B	S, 3	Detroit			492
493	Available, H5	5,575	Continental, B2	4	4½x6-36.1	FS	Cont'l	P	T, Chicago	Y	Zenith	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 60	N	Spicer-B'd	493
494	A & B, 5T		Own	4	5½x3½-42.8		N	P	T, Bush		Schebler		M, Bosch		M, Brown-L	S, 4	Brown-Lipe			494
495	Bollstrom, A		Own	4	4½x5½-28.9			P	Own		Stromberg		M, Bosch		M	I, 4	Own		Own	495
496	Brockway, T	5,000	Continental, B2	4	4½x6-36.1	F	Cont'l	P	T, G & O	Y	Stromberg	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 60	N	Spicer	496
497	Clydesdale, 120B	4,975	Continental, B2	4	4½x6-36.1	F	Own	P	T, Own	Y	Stromberg	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 60	N	Spicer	497
498	Couple-Gear, AC	6,700	Wisconsin	4	5½x7-44.1	FS	N	P	C, Ideal	Y	Stromberg	G	BM, E'sm'nn.	N	†	†, 6	Own		Own	498
499	Day-Elder, E	4,500	Buda	4	4½x6-32.4		Monarch	P	T, Bush		Zenith		M, Berling		M, Brown-L	S, 4	Brown-Lipe		Hartford	499
500	Denby, 210	4,900	Continental, E7	4	4½x5½-32.4	F	Monarch	P	T, Long	Y	Stromberg	G	M, Eisemann	N	M, Own	S, 4	Warner, T53	N	Peters	500
501	Diamond T, S	5,785	Class B, U. S	4	4½x6-36.1	FS	Pierce	P	T, G & O	N	Stromberg	G	M, Bosch	N	M, Brown-L	S, 4	Brown-Lipe		Spicer	501
502	Fageol	5,300	Waukesha, DU	4	4½x6½-32.4	S	Waukesha	P	C, Modine	N	Zenith	DG	M, Dixie	N	M, Brown-L	S, 5	Own	Y	Spicer	502
503	Federal, XC	4,550	Continental, E4	4	4½x5½-32.4	FS	Pharo	P	T, McCord	Y	Zenith	G	M, Eisemann	N	P, Borg & B	S, 4	Warner, WXD	N	Spicer	503
504	Garford, 68	5,000		4	4½x5½-36.1	F	Simplex	P	T, Own	N	Rayfield	G	M, Splitdorf	N	M	S, 4		N		504
505	Gary, M	4,850	Buda, BTU	4	5x6½-40.0	F	McCanna	P	T, Chicago	Y	Master	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 60	N	Spicer	505
506	GMC, 101A	4,550	Continental, E4	4	4½x5½-32.4	FS	Monarch	P	T, Own	N	Marvel	G	M, Eisemann	N	M, Own	S, 4	Own	N	Own	506
507	Gramm-Bernstein, 50	5,500	Continental, B2	4	4½x6-36.1	F		P	T, Own	Y	Stromberg	G	M, Eisemann	N	M, Own	I, 4	Own	N	Own	507
508	Hall	4,850	Continental, E4	4	4½x5½-32.4	FS	Simplex	P	T, Long	Y	Zenith	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 60	N	Spicer	508
509	Hall	4,850	Continental, E4	4	4½x5½-32.4	FS	Simplex	T	T, G & O	Y	Zenith	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 50	N	Hartford	509
510	Harvey, WKA	5,200	Buda	4	4½x6-32.4	F	Duplex	P	T, Chicago		Stromberg		M, Eisemann		P, Borg & B	S, 4	Brown-Lipe			510
511	Highway-Knight, B		Moline-K., W	4	4x6-25.6	F		P	T, Own	N	Zenith	G	M, Eisemann	Y	M, Brown-L	S, 4	Own	N	Thermoid	511
512	Hurlburt, D	5,250	Buda, YTU	4	4½x6-32.4	FS	Duplex	P	T, Own		Flechter		M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 60			512
513	Indiana, 50	4,600	Waukesha, PU7	4	4½x6½-36.1	F	Pierce	P	T, Long	Y	Stromberg	G	M, Eisemann	N	P, Borg & B	S, 4	Brown-L, 60	N	Spicer	513
514	Kelly-Springfield, K50	5,150	Own	4	4½x5½-32.4	F	Pierce	P	C, Long	N	Zenith	G	M, Eisemann	N	C, Own	S, 3	Covert, F	N	Own	514
515	Kimball, F	5,975	Wisconsin, JAU	4	5½x6-42.0	FS	Duplex	P	C, Flexo	N	Zenith	D	M, Berling	N	M, Brown-L	S, 4	Brown-L, 60	N	Spicer	515
516	Kissel, Goliath	4,785	Own	4	4½x5½-28.9	S	Pierce	P	T, Fedders	N	Stromberg	G	M, Eisemann	N	M, Warner	S, 4	Warner, T53	N	Spicer	516
517	Kleiber, D	5,300	Continental, T	4	5½x5½-44.1	S	Pierce	P	T, R'e-T'rn'y	N	Stromberg	G	M, Bosch	N	M, Helo-Shaw	S, 4	Brown-L, 60-4	N	Spicer	517
518	Larrabee, T		Continental, E4	4	4½x5½-32.4	S	Simplex	P	T, Bush	N	Schebler	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 60	N	Spicer	518
519	Mack, AC		Own	4	5x6-40.0	S	Own	P	T, Own	N	Zenith	G	M, Dixie	N	P, Own	S, 3	Own	Y	Spicer	519
520	Maplelcaf, DD		Hinkley, HA1600	4	4½x5½-32.4	FS	Hinkley	P	T, McCord	Y	Stromberg	G	M, Bosch	N	M, Fuller	S, 4	Fuller, H	N	Blood	520
521	Master, B	5,290	Buda, ATU	4	4½x6½-36.1	F	Pierce	P	T, Own	N	Master	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 60	Y	Spicer	521
522	Menominee, J		Wisconsin, A	4	4½x5½-36.1	S		P	T, Own	N	Stromberg	G	M, Eisemann	N	P, Borg & B	S, 4	Brown-L, 60	N	Spicer	522
523	Moreland, 10J	5,350	Cont'l, Class B	4	4½x6-36.1	F	Cont'l	P	T, Own	N	Miller	D	M, Dixie	N	M, Own	S, 4	Own	N	Thermoid	523
524	National, JA		Waukesha, PU7	4	4½x6½-36.1	S	Waukesha	P	C, McKinnon	Y	Zenith	G	M, Eisemann	N	M, Hele-Shaw	S, 4	Brown-L, 60	N	Spicer	524
525	Nelson & LeMoon, F5		Continental, B2	4	4½x6-36.1	F	Pierce	P	T, Chicago		Stromberg		M, Bosch		M, Brown-L	S, 4	Brown-L, 60		Thermoid	525
526	Old Reliable, D	5,000	Wisconsin, J	4	5 1–10x5½-42.0	F	Monarch	P	T, Chicago	Y	Stromberg	G	M, Bosch	N	M, Universal	S, 4	Savage, SD60	Y	Spicer	526
527	Packard, 5E	5,450	Own	4	5x5½-40.0	F	Own	P	T, Fedders	N	Own	G	M, Dixie	N	M, Own	S, 4	Own	N	Ther-Sp	527
528	Parker, M9	5,225	Wisconsin, RAU	4	4½x6-36.1	F	Monarch	P	T, Own	Y	Stromberg	G	M, Bosch	Y	M, Brown-L	S, 4	Warner, T53-1	N	Kinsler-B	528
529	Parker, M9	5,500	Continental, B2	4	4½x6-36.1	F		P	T, Bremer	Y	Stromberg	G	M, Bosch	Y	M, Brown-L	S, 4	Warner, T53	N	Kinsler-B	529
530	Pierce-Arrow, R9	5,500	Own	4	4½x6-38.0	F	Own	P	T, Own	N	Stromberg	G	M, Dixie	N	C, Own	S, 3	Own	Y	Own	530
531	Reynolds, 10A	5,350	Own	4	4½x5½-32.4	F	Hinkley	P	T, Own	Y	Stromberg	dgk	M, Teagle	Y	M, Own	S, 4	Own		Thermoid	531
532	Rowe, FW	4,900	Wisconsin, AU	4	4½x5½-36.1	F	Simplex	P	C, Mayo		Zenith		M, Bosch		M, Brown-L	S, 4	Brown-L, 60			532
533	Royal	5,000	Wisconsin	4	4½x5½-36.1		Monarch	P	T, Kells		Stromberg		M, Bosch		M, Hele-Shaw	I, 3	Own			533
534	Sandow, L	4,775	Continental, E4	4	4½x5½-32.4	S	Monarch	P	T, Chicago	Y	Stromberg	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 60	N	Spicer	534
535	Sanford, W50	4,950	Continental, E4	4	4½x5½-32.4	F	Pierce	P	T, Long	N	Stromberg	G	M, Bosch	N	P, Borg & B	S, 4	Brown-L, 60	N	Spicer	535
536	Schacht		Buda, YTU	4	4½x6-32.4	F	Duplex	P	T, Own	N	Schebler	G	M, Bosch	N	C, Own	S, 8	Own	N	M & E	536
537	Schwartz, D	4,500	Buda, YTU	4	4½x6-32.4	F	Simplex	P	C, Fedders	Y	Stromberg	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 60	N	M & E	537
538	Selden, 5A		Continental, B2	4	4½x6-36.1	F	Cont'l	P	T, Long	Y	Stromberg	G	M, Eisemann	N	M, Detlaff	S, 4	Brown-L, 60	Y	Spicer	538
539	Service, 101	5,275	Buda, YU	4	4½x6-32.4	F	Simplex	P	T, Long	N	Stromberg	G	M, Eisemann	N	P, Borg & B	S, 4	Brown-L, 60	N	Spicer	539
540	Signal, R	5,300	Continental, B2	4	4½x6-361	FS	Pierce	P	T, McCord	Y	Stromberg	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 60	N	Spicer	540
541	Standard, 86		Continental, E7	4	4½x5½-32.4	FS	Monarch	P	T, Long	N	Stromberg	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 60	N	Spicer	541
542	Sterling	5,600	Own	4	5x6½-40.0	F	Waukesha	P	C, Own	Y	Rayfield	G	M, Eisemann		M, M & E	I, 6	Own	N	Universal	542
543	Sterling	5,350	Own	4	5x6½-40.0	F	Waukesha	P	C, Own	Y	Rayfield	G	M, Eisemann		M, M & E	I, 3	Own	N	Spicer	543
544	Super Truck, 100		Wisconsin, RAU	4	4½x6-36.1	F	Simplex	P	T, Chicago	Y	Zenith	G	M, Bosch	N	M, Hilliard	S, 4	Savage, SD60	Y	Spicer	544
545	Tiffin, TW	5,250	Continental, B2	4	4½x6-36.1	FS	Cont'l	P	T, Own	Y	Schebler	G	M, Eisemann	N	P, Borg & B	I, 4	Cotta, S	Y	Peters	545
546	Titan	5,400	Buda, YTU	4	4½x6-32.4	F	Simplex	P	T, B & W	N	Stromberg	G	M, Eisemann	N	P, Borg & B	I, 4	Cotta, S	N	M & E	546
547	United, V		Buda, YU	4	4½x6-32.4	F	Simplex	P	T, G & O		Stromberg		M, Bosch		M, Brown-L	S, 4	Brown-L, 60			547
548	U. S., K	4,850	Waukesha, P	4	4½x6½-36.1	F	Waukesha	P	T, Long		Stromberg		M, Eisemann		P, Borg & B	S, 4	Brown-L, 60			548
549	Walter, (N. Y.), S	5,500	Waukesha, DU	4	4½x6½-32.4	F	Own	P	T, Bush	Y	Stromberg	G	M, Simms	Y	M, Brown-L	S, 4	Warner, T53		M & E	549
550	Ward LaFrance, 5A	5,490		4	5x6½-40.0	F		P	T, Own	Y	Zenith	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 60	N	Spicer	550
551	White, 45	5,000	Own	4	4½x5½-28.9	F	Own	P	T, Own	N	Own	G	M	N	P, Own	S, 4	Own	N	Own	551
552	Wilcox, W		Waukesha, P	4	4½x6½-36.1	S	Waukesha	P	T, Long	N	Stromberg	G	M, Bosch	N	C, Own	S, 4	Own	N		552
553	Wilson	4,800	Continental, E7	4	4½x5½-32.4	FS	Pierce	P	T, Own	N	Marvel	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 60	N	Hartford	553
554	Winther, 109	5,250	Wisconsin, VAU	4	4½x6-32.4	F	Duplex	P	T, Bremer	N	Master	G	M, Eisemann	N	P, Borg & B	S, 4	Brown-L, 60	N	Blood	554
	11,000 Pounds:																			
555	Macear, G	5,250	Continental, B2	4	4½x6-36.1	F	Cont'l	P	T, Own	N	Zenith	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 60	N	Spicer	555
	12,000 Pounds:																			
556	Doane	5,350	Waukesha, PU7	4	4½x6½-36.1	S	Waukesha	P	C, Own		Master		M, Bosch		M, Brown-L	S, 3				556
557	Kelly-Springfield, K60	5,500	Own	4	4½x—32.4	F	Pierce	P	C, Long	N	Zenith	G	M, Eisemann	N	C, Own	S, 3	Covert, F	N	Own	557
558	Packard, 6E	5,700	Own	4	5x5½-40.0	F	Own	P	T, Fedders	N	Own	G	M, Dixie	N	M, Own	S, 4	Own	N	Ther-Sp	558
559	Royal	5,400	Wisconsin	4	5½x6-42.0		Monarch	P	T, Kells		Stromberg		M, Bosch		M, Hele-Shaw	I, 3	Own			559
560	Tiffin, UW	5,450	Continental, B2	4	4½x6-36.1	FS	Cont'l	P	T, Own	Y	Schebler	G	M, Eisemann	N	P, Borg & B	I, 4	Cotta, S	Y	Peters	560
561	United, T		Buda, HU	4	4½x5½-28.9	F	Simplex	P	T, G & O		Stromberg		M, Bosch		M, Brown-L	S, 4	Muncie, 63			561
562	Wichita, S	5,400	Beaver, JAB	4	4½x6-32.4	FS	Duplex	P	C, E & M		Stromberg		M, Bosch		C, Hartford	S, 4	Own			562

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TRUCK SPECIFICATIONS

10,000 (Autohorse)—12,000

Line no.	Final drive (Bevel, Chain, Internal-gear, Spur-and-bevel, Worm) and make of rear axle and model number.	Hotchkiss drive? (Yes or No)	Differential (Bevel, Spur, Worm) and make.	Number and location of driving-wheels (Front, Rear).	Clearance under front and rear axles.	Service and emergency brakes (Contracting, Expanding).	Frame material (Pressed-steel, Rolled-steel) and make.	Front and rear springs (Cantaliver; 1-2, 3-4, or Full elliptic; Transverse).	Make of springs.	Leaves in front and rear springs.	Length and width of front and rear springs.	Driver's position (Left, Right).	Make of steering gear.	Turning-circle diameter (feet and inches).	Wheels (Iron, Steel, Wood) and make.	Wheel-base (standard).	Front and rear tire sizes (dual, pneumatic).	Weight of chassis (pounds).	Perc. of weight on rear axle when empty & when loaded.	Line no.
492	I, Own			1, F		C, E	R, Own		Champion			L	Own		W, Bimel	43	34x10			492
493	W, Timken, 6752	N	W	2, R	9, 10	E, E	R, Own	½, ½	Tuthill	10, 15	44x3-60x4	L	Ross		I, Smith	190	36x6-40x6d	8,900	55, 75	493
494	I, Own			2, R		C, C	R, Own	½, ½	Perfection			L	Gemmer		W	144	48x3½d-48x5d			494
495	I, Own			2, R		C, C	R, Own					L	Gemmer		S, Clark	144	36x6-36x6			495
496	W, Timken, 6752	N	B	2, R		E, E	P, Parish & B	½, ½	Merrill	12, 17	44x3-58x4	L	Gemmer		I, Smith	174	36x6-40x6d	9,075	60, 90	496
497	W, Timken, 6752	N	B	2, R	13¾, 9¾	E, E	P, Parish & B	½, ½	Perfection	11, 18	44x3-56x4	L	Ross		I, Smith	204	36x6-40x12	8,500	65, 76	497
498	B, Own	N		4, FR	11, 11	E, E	R	½, ½	Tuthill	12, 12	43x3-43x3	R	Own	36, 0	S, Own	144	36x5-36x5	11,000	50, 50	498
499	W, Sheldon			2, R		E, E	P, Savage		Iron City			L	Ross		W, Jones	150	36x5-40x6d			499
500	I, Clark, W100	Y	B	2, R	13¾, 13¾	E, E	P, Detroit	½, ½	Detroit	10, 18	42x3-54x4	L	Gemmer	62, 0	S, Russell	170	36x6-40x12	8,590	58, 80	500
501	W, Timken	Y	W	2, R		E, E	P	½, ½	Mather	10, 14	46x3-56x4	L	Gemmer		I, Smith	180	38x6-40x6d	8,790	50, 90	501
502	W, Timken, 6752	N	B	2, R	14½, 10½	E, E	P, Own	½, ½	Mather	9, 16	46x3-60x4	L	Ross	59, 8	W, Prudden	172	36x6-40x6d	8,300	56, 73	502
503	W, Timken, 6752	N	B	2, R	9, 10	E, E	R	½, ½	Mather	8, 16	44x3-56x3½	L	Gemmer	57, 0	I, Smith	156	36x6-40x6d	8,100	65, 78	503
504	C	N	B	2, R		C, E	P	½, ½		10, 17	48x3-50x3	R			I, p	128	36x6-40x6d	8,870		504
505	W, Timken, 6752	Y	W	2, R	9, 10½	E, E	P	½, ½	Detroit	13, 18	46x3-60x4	L	Ross	52, 0	S, Dayton	182	36x6-40x6d	8,500	50, 20	505
506	W, Timken, 6752	N	B	2, R	11½, 10	E, E	R, Own	½, ½	Detroit	10, 16	44x3-54x4	L	Jacox	55, 0	Own	163	36x6-40x6d	8,000	56, 75	506
507	W, Standard	Y	B	2, R	12¾, 10½	E, E	P, Own	½, ½	Perfection	10, 16	48x3½-64x4	L	Ross	62, 0	I, Smith	168	36x6-40x6d	9,500	76½, 92½	507
508	W, Timken, 6752	Y	W	2, R	8, 9	E, E	R	½, ½	Perfection	12 18	45x3-52x4	L	Gemmer		I, Smith	144	36x5-40x6	8,400	25, 80	508
509	C, Timken, 4800	Y	W	2, R	8, 16	E, E	R	½, ½	Detroit	12, 18	45x3-52x3½	L	Gemmer		I, Smith	144	36x5-40x6	7,530	25, 80	509
510	W, Sheldon			2, R		E, E	R, Own	½, ½	Sheldon				Ross		I, Smith	160	36x6-40x6d			510
511	W	Y		, R	11, 10¾	E, E	P	½, ½	Sheldon		46x3-58x4	L			W, Schwarz	159	36x5-40x6d	8,400		511
512	W, Hindley			2, R		E, C	P, Savage	½, ½	Perfection				Ross		W, Wayne	170	36x5-40x6d			512
513	W, Sheldon, W50	N	B	2, R	9½, 10½	E, E	R, Illinois	F, ½	Sheldon	10, 15	40x3-50x4	L	Wohlrab	56, 0	I, Smith	167	36x5-40x6d	8,730	66½, 78½	513
514	C, Own	N	B	2, R	11½, 15½	E, E	P	½, ½	Perfection	11, 14	46½x3-56½x3½	L	Gemmer	56, 0	W	150	36x6-40x6d	9,175	50, 90	514
515	W, Sheldon, W50	Y	B	2, R		E, E	P	½, ½	U. S	12, 16	45½x3-53½x4	L	Ross	39, 6	I, Smith		36x6-40x12		50, 80	515
516	W, Sheldon, W30	Y	W	2, R	10, 8	E, E	P, Smith	½, ½	Mather	11, 13	44x3-62x3½	L	Jacox	50. 0	I, Smith	180	36x6-36x6d	7,000	57½, 74½	516
517	W, Timken, 6752	N	W	2, R	9½, 10½	E, E	R, Own	½, ½	Betts	11, 15	50x3-52x4	R	Ross		I, Smith	180	36x6-40x12	9,200	50, 75	517
518	W, Sheldon, W50	Y	B	2, R	14, 10½	E, E	P, Savage	½, ½	Merrill	12, 17	44x3-58x4	L	Ross		I, Smith	172	36x6-40x6d	8,500	40, 84	518
519	C, Own	N	B	2, R	11½, 10½	C, E	P, Own	½, ½	Merrill	9, 13	46x3½-52x4	L	Own	52, 6	W, Own	168		8,650	48, 90	519
520	W, Sheldon, W51	Y	B	2, R	10½, 10½	E, E	R	½, ½	Sheldon	–, 13	46x2-56x4	L	Ross		I, Smith	160	36x6-40x6d	8,000	60, 70	520
521	W, Timken, 6752	Y	B	2, R	11, 11½	E, E	P, Parish & B	½, ½	Detroit	13, 18	46x3-60x4	L	Ross	50, 0	I, Smith	170	36x6-40x6d	8,000	58, 72	521
522	W, Timken, 6752	N	B	2, R		E, E	R, Own	½, ½	Tuthill	9, 12	44x3-54x4	L	Gemmer		W, Standard	160	36x6-40x6d	8,500		522
523	W, Timken, 6752	N	W	2, R	9, 10	E, E	P	½, ½	U. S	12, 14		L	Ross		I, Smith	162	36x6-40x6	9,400	55, 67	523
524	W, Timken, 6760	N	W	2, R	9, 10½	E, E	R	½, ½	Mather	11, 19	44x3½-60x4	L	Ross	56, 0	W, Hayes	170	36x6-40x6d	8,650		524
525	W, Timken, 6752	Y		2, R		E, E	R, Own	½, ½	Tuthill				Lavine		W, Prudden		36x6-40x6d			525
526	W, Sheldon, W50	Y	W	2, R	10½, 10½	E, E	R	½, ½	Sheldon	10, 16	48x3-60x4	R	Ross		W, St. Marys	168	36x6-40x6d	8,400	–, 70	526
527	W, Own	N	S	2, R	11¾, 9½	C, E	R, Own	½, ½		12, 13	42½x3-54x3½	L	Own	62, 0	S	156	36x6-40x6d	8,650	57, 76	527
528	W, Own	N	B	2, R	14½, 11	C, E	P, Smith	½, ½	Tuthill	9, 14	44x3-60x4	L	Ross	60, 0	W, Bimel	160	36x6-40x6d	8,580	58½, 78	528
529	W, Timken, 6752	N	B	2, R	14½, 10½	C, E	P	½, ½	Tuthill	9, 14	43x3-60x4	L	Ross	60, 0		160	36x6-40x6d	8,580	59, 78	529
530	W, Own	N	W	2, R	12, 10½	C, E	P, Own	½, ½	Spring Perch	11, 16	33x2½-48x3	R	Own	50, 6	W, Own	168	36x5-40x6d	8,450	63 75	530
531	W, Own	Y	B	2, R	9¾, 10½	E, E	R, Standard	½, ½	Own		44x3-56x4	L	Own		I, Smith	165	36x6-40x6			531
532	W, Sheldon, W50			2, R		E, E	R, Own	½, ½	Sheldon				Ross			171	36x6-40x6d			532
533	W, Timken			2, R		E, E	R, Own	½, ½	Merrill				Ross		W	168	36x6-40x6d			533
534	W, Timken, 6752	N	W	2, R	8½, 8	E, E	P, Savage	½, ½	Garden City	10, 20	44x3-56x3½	R	Ross	41, 0	W, Standard	175	36x6-40x6d	7,950	20, 70	534
535	W, Sheldon, W50	Y	B	2, R	10½, 10½	E, E	P	½, ½	Perfection	10, 13	46x3-54x3½	L	Ross	58, 0	I, Smith	174	36x5-40x6d	7,600	80, 87	535
536	W, Own	N	B	2, R	10, 9	C, E	R, Own	½, ½	National	9, 17	35x3-50x3	L	Own		W, St. Marys	168	36x5-40x6d	8,500	80, 80	536
537	I, Torbensen, EI	Y	B	2, R	9½, 11¾	E, C	P, Parish	½, ½	Rowland	10, 15	40x3-56x4	L	Ross		I, Smith	170	36x6-36x10	7,600		537
538	W, Timken, 6752	N	B	2, R	–, 10½	E, E	P, Parish & B	½, ½	Perfection	11, 15	46x3½-60x4	L	Gemmer	62, 0	S	164	36x6-40x12	9,700	57, 76	538
539	W, Timken, 6752	N	B	2, R	9, 10½	E, E	P, Own	½, ½	Mather	12, 15	46x3-60x3½	L	Ross	56, 0		171½	36x6-40x6d	8,760	–, 75	539
540	W, Timken, 6752	N	B	2, R	11, 11	E, E	P, Savage	½, ½	Detroit	11, 18	44x3-56x5	L	Ross	71, 0	I, Smith	180	36x6-40x12	9,510	–, 84	540
541	W, Timken, 6752	N	B	2, R	9, 10	E, E	P, Parish & B	½, ½	Perfection		45½x3-52½x4	L	Gemmer		S, Dayton	160	36x6-40x6d			541
542	C, Own	N	S	2, R	11, —	E, C	P	½c, ½c	Mather	10, 12	48x3-60x4	L	Ross	47, 9	I, Smith	174	36x6-40x6d	10,000	59, 91	542
543	W, Timken, 6752	N	W	2, R	11, 9½	E, E	P	½c, ½c	Mather	10, 12	48x3-60x4	L	Ross	47, 2	W, Prudden	168	36x6-40x6d	9,700	58, 92	543
544	W, Sheldon, W51	N	B	2, R	11½, 12	E, E	P	½, ½	Sheldon	11, 13	44x3-58x4	L	Ross	50, 0	S	164	36x5-40x6d	8,500		544
545	W, Sheldon, W51	N	B	2, R	9, 10	E, E	R	½, ½	Kalamazoo	10 16	42x3½-53x4	L	Ross	69, 0	I, Smith	168	36x6-40x6d	8,000	40, 60	545
546	I, Clark, 5	N	B	2, R	12, 16	E, C	P, Parish & B	½, ½	Sheldon	9, 13	48x3-60x3½	L	Lavine	50, 0	S, Clark	156	36x5-40x6d	9,100	57, 80	546
547	I, Clark, 5D			2, R		E, C	P, Detroit	½, ½	Detroit				Ross		S	160	36x5-40x6d			547
548	W, Sheldon, W50			2, R		E, E	R, Own	½, ½	Sheldon				Lavine		S, Dayton	168	36x5-40x6d			548
549	I, Own	Y	W	2, R	14, 14	C, C	P	½, ½	Perfection		48x3-52x5	L	Ross	48, 0	S, Dayton	168	36x6-40x6d	8,000	50, 80	549
550	W, Timken, 6752	N	W	2, R	9¾, 10⅝	E, E	P, Detroit	½, ½			50x3-60x4	L	Ross		I, Smith	190	36x6-40x6d	9,300	–, 85	550
551	I, Own	N	BS	2, R	10½, 10½	C, E	R	½, ½				L	Own	61, 0	S	174	36x6-40x6d	7,925	54, 70	551
552	W, Sheldon, W50	N	B	2, R		E, E	P	½, ½	Sheldon	12, 13	48x3½-62x5	L	Own		I, Smith	162	36x5-40x6d	9,100	25, 75	552
553	W, Timken, 6752	Y	B	2, R	9, 10½	E, E	R, Own	½, ½	Perfection	11, 17	46x3-60x4	L	Ross		W	160	36x6-40x6d	7,500	60, 80	553
554	I, Clark, 5D	Y	B	2, R	11, 14	E, E	R, Own	½, ½	Mather	8, 12	46x3-56x4	R	Ross	68, 0	S, Clark	162	36x5-40x6d	8,600	45, 80	554
555	W, Timken, 6752	N	B	2, R	9, 10¼	E, E	P, Parish	½, ½	Merrill	11, 15	42x2½-56x4	L	Ross		S, Dayton	186	36x5-40x6d	8,750	–, 70	555
556	C, Own			2, R			R	½, ½					Lavine		S, West	178	36x6-40x6d			556
557	C, Own	N	B	2, R	11½, 15½	E, E	P	½, ½	Perfection	12, 15	48½x3-56½x3½	L	Gemmer	56, 0	W	150	36x6-40x7d	9,500	50, 90	557
558	W, Own	N	S	2, R	11¾, 9½	C, E	R	½, ½		12, 14	42½x3-54x3½	L	Own	62, 0	S	156	36x6-40x7d	8,925	58, 78	558
559	W, Timken			2, R		E, E	R, Own	½, ½	Merrill				Ross		W	168	36x6-40x6d			559
560	W, Sheldon, W51	N	B	2, R	9, 10	E, E	R	½, ½	Kalamazoo	10, 18	42x3½-52x4	L	Ross	34, 6	I, Smith	168	36x6-40x12	9,000	40, 60	560
561	I, Torbensen, C			2, R		E, C	R, Detroit	½, C	Detroit				Jacox		S		34x3½-34x7			561
562	B, Own			2, R		E, E	P, Savage	½, ½	Detroit				Ross		I, Smith	165	38x6-40x6d			562

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13,000—15,000 **INTERNAL-COMBUSTION**

Line no.	Brand name and model name or number	Price f. o. b. factory with seat and tires but without body.	Make of engine and model number.	Number of cylinders.	Bore and stroke, and N. A. C. C. horse-power.	Lubrication (Forced-feed, Splash).	Make of gov-ernor (None).	Water-circulation (Pump, Thermo-siphon).	Radiator (Cellular, Tubular) and make.	Radiator guard included in price? (Yes or No)	Make of carbu-reter.	Fuels (Distillate, Gasolene, Kerosene).	Ignition (Battery, Magneto) and make of magneto.	Electric starting and lighting included in price? (Yes or No)	Clutch (Cone, Multiple-disk, Plate) and make.	Transmission (Individual-clutch, Planetary, Sliding-gear) and number of forward speeds.	Make of transmission and model number.	Power take-off included in price? (Yes or No)	Make of univer-sal joints.	Line no.
	13,000 Pounds:																			
563	Mack, A C	$5,750	Own	4	5x6–40.0	FS	Own	P	T, Own	Y	Zenith	G	M, Aero	N	P, Own	S, 3	Own	N	Spicer	563
	14,000 Pounds:																			
563a	Available, H7	6,000	Waukesha	4	5x6½-40.0	FS	Waukesha	P	T, Chicago	Y	Stromberg	G	BM, Bosch	N	M, Brown-L	S, 4	Brown-Lipe		Spicer	563a
564	Couple-Gear, LDC	7,350	Wisconsin	4	5½x7-44.1	FS	N	P	C, Ideal	Y	Stromberg	G	BM, E'sm'nn.	N	†	† 6	Own		Own	564
565	Larrabee, W		Continental, B2	4	4½x6-36.1	F	Cont'l	P	T, Bush	N	Schebler	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 60	N	Spicer	565
566	Old Reliable, K	6,000	Waukesha, P	4	4½x6½-36.1	S	Waukesha	P	T, Chicago	Y	Stromberg	G	M, Bosch	N	M, Universal	S, 4	Savage, 6495	Y	Hartford	566
567	Royal	6,500	Wisconsin	4	5½x7-44.2		Monarch	P	T, Kells		Stromberg		M, Bosch		M, Hele-Shaw	I, 3	Own			567
568	Winther, 140	5,900	Wisconsin, RBU	4	5 x6-40.0	F	Duplex	P	T, Bremer	N	Master	G	M, Eisemann	N	P, Borg & B	S, 4	Brown-L, 60	N	Blood	568
	15,000 Pounds:																			
569	Mack, AC		Own	4	5x6-40.0	S	Own	P	T, Own	N	Zenith	G	M, Dixie	N	P, Own	S, 3	Own	Y	Spicer	569
570	Sterling	6,000	Own	4	5x6¼-40.0	F	Waukesha	P	C, Own	Y	Rayfield	G	M, Eisemann		M, M & E	I, 6	Own	N	Universal	570

ELECTRIC TRUCK SPECIFICATIONS

Line no.	Brand name and model name or number.	Price f. o. b. factory with seat, tires and battery but without body.	Price f. o. b. factory with seat and tires but without battery and body.	Number and make of motors.	Number of cells in battery and number of plates in each cell. Lead.	Nickel	Mileage on one battery charge at high speed on level: Load-ed.	Em'ty	Number of forward and reverse speeds. Make of controller.	Road speeds (miles per hour) at different controller speeds: 1	2	3	4	5	R1	R2	Primary drive (Bevel, Chain, None, Spur, Worm).	Primary and final reduction ratios (to 1). Final drive (Bevel, Chain, Spur, Worm), and make of rear axle and model number.	Hotchkiss drive? (Yes or No)	Number and location of driving-wheels (Front, Rear). Differential (Bevel, Spur, Worm) and make.		Line no.
	750 Pounds																						
1	Ward, WS2			1, G. E		-60, A4			Westingh'se	4, 2				11				W, Sheldon		Y	B	2, R	1
	1,000 Pounds																						
2	C. T		$2,100	2, G. E	42, 13	-60, A5	55-		Own	4, 2				13			S	S, Own	-10	N		2, R	2
3	Lansden			1, G. E			60-		G. E	4, 2							B	C, Own				2, R	3
4	Walker, M		1,850	1, West'h's	44,	-60,	40-			5, 5				15		15	N	S, Own	-16.8	Y	B, Own	2, R	4
	1,250 Pounds																						
5	Ward, WA			1, G. E		-60, A5			G. E	4, 2				10				W, Sheldon		Y	B	2, R	5
	2,000 Pounds																						
6	Atlantic, 1C			1, G. E	44, 13	-	60-80		G. E	4, 2				10			C	C, Timken	-10.0			2, R	6
7	C. T		2,550	2, G. E	42, 17	-60, A6	50-		Own	4, 2				12			S	S, Own	-11.5	N		2, R	7
8	Lansden			1, G. E	44,	-60, A6	60-		G. E	4, 2				10			B	C, Own	-11.6			2, R	8
9	Walker, K		2,300	1, West'g'h's	44,	-60,	40-			5, 5				14			N	S, Own	-16.8	Y	B, Own	2, R	9
10	Ward, WB			1, G. E		-60, A6			G. E	4, 2				8½		8½		W, Sheldon		Y	B	2, R	10
	4,000 Pounds																						
11	Atlantic, 2C			1, G. E	44, 17	-	50-65		G. E	4, 2				9			C	C, Timken	-10.0			2, R	11
12	C. T		2,950	2, G. E	42, 21	-60, A8	50-		Own	4, 2				10			S	S, Own	-12.1	N		2, R	12
13	Lansden			1, G. E	44,	-60, A8	50-		G. E	4, 2				9			B	C, Own	-11.4			2, R	13
14	Oneida, 2E		2,600	, Own			40-		Own	5, 5							S	S, Own				2, R	14
15	Walker, L		2,700	1, West'gh's	44,	-60,	40-			5, 5				13		13	N	S, Own	-17.5	Y	B, Own	2, R	15
16	Ward, WD			1, G. E		-60, A8			G. E	4, 2				7				W, Sheldon		Y	B	2, R	16
	7,000 Pounds																						
17	Atlantic, 3C			1, G. E	44, 21	-	45-57		G. E	4, 2				8			C	C, Timken	-13.0			2, R	17
18	Couple-Gear, H		4,750	4, Own	44, 23	-	20, 30			5, 5				10			B	B				4, FR	18
19	C. T		3,700	2, G. E	42, 27	-60, A10	45-		Own	4, 2				8			S	S, Own	-17.3	N		2, R	19
20	C. T		4,300	4, G. E	42, 27	-60, A10	45-		Own	4, 2				9			S	S, Own	-17.3	N		4, FR	20
21	Lansden			1, G. E	44,	-60, A10	50-		G. E	4, 2				8			B	C, Own	-13.0			2, R	21
22	Walker, P		3,700	1, West'gh's	44,	-60,	40-			5, 5				11		11	N	S, Own	-18.1	Y	B, Own	2, R	22
23	Ward, WF			1, G. E		-60, A10			G. E	4, 2				6				W, Sheldon		Y	B	2, R	23
	10,000 Pounds																						
24	Atlantic, 5C			1, G. E	44, 25	-	40-50		G. E	5, 2				7			C	C, Timken				2, R	24
25	Couple-Gear, A		5,250	4, Own	44, 27	-	20, 30			5, 5				7			B	B				4, FR	25
26	C. T		4,800	4, G. E	42, 31	-60, A12	45-		Own	4, 2				8			S	S, Own	-20.1	N		4, FR	26
27	Lansden			1, G. E		-60, A12	45,		G. E	4, 2				7			B	C, Own	-14.6			2, R	27
28	Walker, N		4,000	1, West'gh's	44,	-60,	40,			5, 5				10		10	N	S, Own	-18.1	Y	B, Own	2, R	28
29	Ward, WH			1, G. E		-60, A12			G. E	4, 2				5				W, Sheldon		Y	B	2, R	29
	12,000 Pounds																						
30	Atlantic, 6C			1, G. E	44, 25		35-45		G. E	5, 2				6			C	C, Timken	-15.6			2, R	30
31	Lansden			1, G. E			45-		G. E	4, 2							B	C, Own				2, R	31
	14,000 Pounds																						
32	Couple-Gear, LD		5,900	4, Own	44, 29	-	20, 30			5, 5				7			B	B				4, FR	32
	Tractors																						
33	Walker, 3		3,000	1, West'gh's	44,	-60,	20,			5, 5				6		6	N	S, Own	-18.1	Y	B, Own	2, R	33
34	Walker, 5		3,700	1, West'gh's	44,	-60,	20,			5, 5				6		6	N	S, Own	-18.1	Y	B, Own	2, R	34
35	Walker, 7		6,000	1, West'gh's	44,	-60,	20,			5, 5				6		6	N	S, Own	-18.1	Y	B, Own	2, R	35

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TRUCK SPECIFICATIONS — 13,000—15,000

Line no.	Final drive (Bevel, Chain, Internal-gear, Spur-and-bevel, Worm) and make of rear axle and model number.	Hotchkiss drive? (Yes or No)	Differential (Bevel, Spur, Worm) and make.	Number and location of driving-wheels (Front, Rear).	Clearance under front and rear axles.	Service and emergency brakes (Contracting, Expanding).	Frame material (Pressed-steel, Rolled-steel) and make.	Front and rear springs (Cantaliver; 1-2, 3-4, or Full elliptic; Transverse).	Make of springs.	Leaves in front and rear springs.	Length and width of front and rear springs.	Driver's position (Left, Right).	Make of steering gear.	Turning-circle diameter (feet and inches).	Wheels (Iron, Steel, Wood) and make.	Wheel-base (standard).	Front and rear tire sizes (dual, pneumatic).	Weight of chassis (pounds).	Perc. of weight on rear axle when empty & when loaded.	Line no.
563	C.....	.....	.....	2, R	.....	C, E	.....	½, ½	.....	9, 17	46x3½-52x4	L	.....	52, 6	W.....	168	36x6-40x12	8,672	.....	563
563a	W, Savage.....	N	.....	2, R	.....	E, E	R, Own.....	½, ½	Tuthill.....	.....	44x3-60x4.....	L	Ross.....	.....	I, Smith ...	190	36x6-40x14	10,300	.....	563a
564	B, Own.....	N	.....	4, FR	11, 11	E, E	R.....	½, ½	Tuthill.....	14, 14	50x3½-50x3½...	R	Own.....	36, 0	S, Own.....	144	36x6-36x6.....	12,500	50, 50	564
565	W, Sheldon, W51..	Y	B	2, R	10, 10	E, E	P.....	½, ½	Merrill.....	12, 17	44x3-58x4.....	L	Ross.....	.....	I, Smith.....	.....	36x6-40x12	8,960	42, 86	565
566	C, Sheldon, RA70.	N	B	2, R	9⅞, 17	C, E	R.....	½, ½	Sheldon....	11, 13	51½x3½-59½x3½..	R	Ross.....	.....	W,St. Marys	124	36x6-40x7d.....	10,240	—, 85	566
567	W, Timken.....	.....	.....	2, R	.....	E, E	R, Own.....	½, ½	Merrill.....	.....	.....	.....	Ross.....	.....	W.....	168	36x7-40x7d.....	.....	.....	567
568	I, Clark, 5D.....	Y	B	2, R	11, 14	E, E	R, Own.....	½, ½	Mather....	13, 16	46x3-56x4.....	R	Ross.....	68, 0	S, Clark....	162	36x6-40x7d.....	9,500	45, 80	568
569	C, Own.....	N	B	2, R	11½, 10¾	C, E	P, Own.....	½c,½c	Merrill.....	9, 17	46x3½-52x4.....	L	Own.....	52, 6	W, Own....	180	.....	9,050	50, 72	569
570	C, Own.....	N	S	2, R	11, —	E, C	P	½c,½c	Mather	10, 14	48x3-60x4.....	L	Ross.....	47, 9	I, Smith....	174	36x6-40x7d.....	11,000	66, 91	570

ELECTRIC TRUCK SPECIFICATIONS

Line no.	Service and emergency brakes (Contracting, Expanding).	Width & thickness of lining required for service and emergency brakes.	Number of pieces of lining and length of each required for service and emergency brakes.	Make of brake lining.	Front and rear springs (Cantaliver; 1-2, 3-4, or Full elliptic; Transverse).	Frame material (Pressed-steel, Rolled-steel, Wood) and make.	Leaves in front and rear springs.	Length and width of front and rear springs.	Make of springs.	Make of steering-gear.	Turning-circle diameter (feet and inches).	Wheel-base (standard).	Wheels (Iron, Steel, Wood) and make.	Long and short wheel-base (None, Optional).	Front and rear tire sizes (dual, pneumatic).	Percentage of weigh on rear axle when empty and when loaded.	Weight of chassis (lb.).	Body weight allowance (pounds).	Line no.
1	E, E	.....	.....	.....	.....	Own.....	½, ½	.....	.....	Sheldon....	Own.....	.....	W, Schwarz	88	.....	32x2½-32x3	1,750	.....	500	1
2	E, *	4, 12½....	2x¼...	Thermoid...	R, Own.....	¾, ½	8, 8	40x1¾-46x2½	Sheldon....	Own.....	38, 8	W, Own....	89¼	95⅜.....	..x3 -..x3	2,000	..-60	800	2
3	E, C	.....	.....	.....	P, Own.....	½, ½	.....	.....	Own.....	Own.....	.....	W, Jones..	.....	.....	.....	.....	.....	.....	3
4	C, E	.....	.....	.....	P, Own.....	½, ½	.....	.....	Mather....	Ross....	34, O	S, Own....	93	O-O.....	34x3 -36x3½	2,300	50-65	600	4
5	E, E	.....	.....	.....	Own.....	½, ½	.....	.....	Sheldon....	Own.....	.....	W, Schwarz	90	.....	32x3 -34x3½	2,730	.....	800	5
6	.....	.....	.....	.....	.....	½, ½	.....	.....	.....	Ross.....	.....	.....	103	.....	34x3½-36x4	.....	.....	.....	6
7	E, *	4, 15.....	2x¼...	Thermoid...	R, Own.....	½, ½	11, 10	46x2 -48x2½	Sheldon....	Own.....	42, 4	W, Own....	101	106½.....	..x3½-..x4	2,400	..-60	1,200	7
8	E, C	.....	.....	.....	P, Own.....	½, ½	.....	.....	Own.....	Own.....	.....	W, Jones...	106	.....	36x3 -36x3½	.....	.....	.....	8
9	C, E	.....	.....	.....	P, Own.....	½, ½	.....	.....	Mather....	Ross....	38, 0	S, Own.....	96	0-0.....	34x3½-36x4	2,700	54-65	1,000	9
10	E, E	.....	.....	.....	Own.....	½, ½	.....	.....	Sheldon....	Own.....	.....	W, Schwarz	102	.....	34x3½-36x4	3,430	.....	1,100	10
11	.....	.....	.....	.....	.....	½, ½	.....	.....	.....	Ross.....	.....	.....	115	.....	34x4 -34x3d	.....	.....	.....	11
12	E, *	4, 18.....	2x¼...	Thermoid...	R, Own.....	½, ½	10, 11	48x2½-48x3	Sheldon....	Own.....	47, 11	W, Own....	116	126.....	..x4 -..x4d	4,000	..-60	1,500	12
13	E, C	.....	.....	.....	P, Own.....	½, ½	.....	.....	Own.....	Own.....	.....	W, Jones...	120	.....	36x4 -36x3d	.....	.....	.....	13
14	.....	.....	.....	.....	P, Own.....	½, ½	.....	.....	Mather....	Own.....	.....	W.....	111	.....	36x4 -36x6	.....	.....	.....	14
15	C, E	.....	.....	.....	P, Own.....	½, ½	.....	.....	Mather....	Ross....	44, O	S, Own.....	112	O-O.....	38x4 -38x6	3,800	48-66	1,500	15
16	E, E	.....	.....	.....	Own.....	½, ½	.....	.....	Sheldon....	Own.....	.....	W, Schwarz	114	.....	36x4 -36x7	4,500	.....	1,400	16
17	.....	.....	.....	.....	.....	½, ½	.....	.....	.....	Own.....	.....	.....	135	.....	36x5 -40x5d	.....	.....	.....	17
18	.....	.....	.....	.....	.....	½, ½	.....	.....	.....	Own.....	.....	S, Own.....	96	.....	36x3½-36x4d	.....	.....	.....	18
19	C, *	.....	.....	.....	R, Own.....	½, ½	10, 14	48x2½-48x3	Sheldon....	Own.....	50, 0.	W, Own....	126	136.....	..x5 -..x5d	5,000	..-60	2,000	19
20	C, *	.....	.....	.....	R, Own.....	½, ½	12, 12	48x3 -48x3	Sheldon....	Own.....	49, 4	W, Own....	122	132.....	..x6 -..x4d	5,800	..-55	2,000	20
21	E, C	.....	.....	.....	P, Own.....	½, ½	.....	.....	Own.....	Own.....	.....	W, Jones...	130	.....	36x5 -36x4d	.....	.....	.....	21
22	C, E	.....	.....	.....	P, Own.....	½, ½	.....	.....	Mather....	Ross....	48, 0	S, Own.....	131	0-0.....	36x5 -38x5d	5,600	54-71	2,000	22
23	E, E	.....	.....	.....	Own.....	½, ½	.....	.....	Sheldon....	Own.....	.....	W, Schwarz	132	.....	36x5 -36x8	6,600	.....	1,800	23
24	.....	.....	.....	.....	.....	½, ½	.....	.....	.....	Ross.....	.....	.....	144	.....	36x6 -40x5d	.....	.....	.....	24
25	.....	.....	.....	.....	.....	½, ½	.....	.....	.....	Own.....	.....	S, Own.....	96	.....	36x4 -36x5d	.....	.....	.....	25
26	C, *	.....	.....	.....	R, Own.....	½, ½	14, 14	48x3 -48x3	Sheldon....	Own.....	52, 8	W, Own....	132	150.....	..x7 -..x5d	6,500	..-55	2,500	26
27	E, C	.....	.....	.....	P, Own.....	½, ½	.....	.....	Own.....	Own.....	.....	W, Jones...	142	.....	36x6 -36x5d	.....	.....	.....	27
28	C, E	.....	.....	.....	P, Own.....	½, ½	.....	.....	Mather....	Ross....	54, 0	S, Own.....	141	0-0.....	36x6 -38x6d	6,400	55-75	2,500	28
29	E, E	.....	.....	.....	Own.....	½, ½	.....	.....	Sheldon....	Own.....	.....	W, Schwarz	144	.....	36x7 -40x10	8,325	.....	2,400	29
30	.....	.....	.....	.....	.....	½, ½	.....	.....	.....	Ross.....	.....	.....	156	.....	36x6 -40x6d	.....	.....	.....	30
31	E, C	.....	.....	.....	P, Own.....	½, ½	.....	.....	Own.....	Own.....	.....	W, Jones..	.....	.....	.....	.....	.....	.....	31
32	.....	.....	.....	.....	.....	½, ½	.....	.....	Own.....	Own.....	.....	S, Own.....	96	.....	36x5d -36x5d	.....	.....	.....	32
33	C, E	.....	.....	.....	P, Own.....	½, ½	.....	.....	Mather....	Ross....	25, 0	S, Own.....	70	.....	34x4 -38x6	4,500	.....	.....	33
34	C, E	.....	.....	.....	P, Own.....	½, ½	.....	.....	Mather....	Ross....	40, 0	S, Own.....	120	.....	36x5 -38x6d	6,000	.....	.....	34
35	C, E	.....	.....	.....	P, Own.....	½, ½	.....	.....	Mather....	Ross....	32, 0	S, Own.....	86½	.....	36x6 -38x6	7,200	.....	.....	35

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Motor Truck Specifications

MOTOR TRUCK MAKERS

(Continued from page 45)

Hurlburt Motors, Inc., New York City.—1½, 2½, 3½ & 5-ton.

I

Independent (Iowa) — Independent Motor Truck Co., Davenport, Ia.—1½ & 2-ton.
Independent (Ohio) — Independent Motors Co., Youngstown, O.—1 & 2-ton.
Indiana Truck Corp., Marion, Ind.—1¼, 1½, 2½, 3½ & 5-ton.
Inland Motor Co., Evansville, Ind.—1½ & 2-ton.
International Harvester Co. of America, Chicago (factory Akron, O.).—¾, 1, 1½, 2 & 3½-ton.
International Motor Co. See Mack.
Iowa Motor Truck Co. See Bell.

J

Jackson Motors Co., Jackson, Mich.—2½-ton.
Jones Motor Car Co., Wichita, Kan.—1-ton.
Jumbo—Nelson Motor Truck Co., Saginaw, Mich.—1½, 2, 2½, 3, 3½ & 4-ton.

K

Kalamazoo Motors Corp., Kalamazoo, Mich.—1½, 2½ & 3½-ton.
Kankakee Auto Co., Kankakee, Ill.—2½-ton.
Kearns-Dughie Motors Co., Beavertown, Pa—¾ & 1½-ton.
Keldon—House Cold Tire Setter Co., St Louis, Mo.—2-ton.
Kelly-Springfield Motor Truck Co., Springfield, O.—1½, 2½, 3½, 4, 5 & 6-ton.
Kentucky Wagon Co. See Old Hickory.
Keystone—Commercial Car Unit Co., Philadelphia, Pa.—2-ton.
Kimball Motor Truck Co., Los Angeles Cal.—2, 2½, 3, 4 & 5-ton.
King-Zeitler Co. See K-Z.
Kissel Motor Car Co., Hartford, Wis.—¾, 1½, 2, 3½ & 5-ton.
Kleiber Co., San Francisco, Cal.—1, 1½, 2 2½, 3½ & 5-ton.
Koehler Motors Corp. (H. J.), Newark, N. J—1¼ & 2½-ton.
Kuhn Tractor-Truck Co. Seattle, Wash.—5-ton.
K-Z—King-Zeitler Co., Chicago.—1½, 2½ & 3½-ton.

L

Lambert—Buckeye Mfg. Co., Anderson, Ind—1-ton.
Lange Motor Truck Co., Pittsburgh, Pa.—2-ton.
Landshaft & Sons (Wm.), Chicago.—1 & 2-ton.
Lansden Co., Brooklyn, N. Y.—½, 1, 2, 3½, 5 & 6-ton electric.
Larrabee-Deyo Motor Truck Co., Binghamton, N. Y.—1½, 2½, 3½, 5 & 7-ton.
Lewis-Hall Iron Works. See Hall.
L. M. C.—Louisiana Motor Car Co., Shreveport, La.—2½-ton.
Locomobile Co. See Riker.
Louisiana Motor Car Co. See L. M. C.
Luedinghaus Wagon Co., St. Louis, Mo.—2-ton.
Luverne Motor Truck Co., Luverne, Minn.—2-ton.

M

Maccar Motor Truck Co., Scranton, Pa.—1, 1½, 2½, 3½ & 5½-ton.
Mack—International Motor Co., New York City.—1½, 2, 3½, 5, 6½ & 7½-ton.
Maplelcaf Mfg. Co., Montreal, Canada.—1½, 2½, 3½ & 5-ton.
Marshall Mfg. Co., Chicago.—¾ & 2-ton.
Martin Truck & Body Co. See Atlas.
Master Trucks, Inc., Chicago.—1½, 2, 3½, 5 & 7½-ton.
Maxwell Motor Co., Detroit, Mich.—1½-ton.
Menominee Motor Truck Co., Menominee, Mich.—1, 1½, 2, 3½ & 5-ton.
Midland Motor Car & Truck Co., Oklahoma City, Okla.—2 & 2½-ton.
Milwaukee Locomotive Mfg. Co. See Walter (Wis.).
Minnesota Machinery & Foundry Co. See Pony.
Moreland Motor Truck Co., Los Angeles, Cal.—1½, 2½, 4 & 5-ton.
Muskegon Engine Co., Muskegon, Mich.—2-ton.
Mutual Truck Co., Sullivan, Ind.—2-ton.
Myers Co. (E. A.), Pittsburgh, Pa.—1 & 1½-ton.

N

Napoleon Motors Co., Traverse City, Mich.—1 & 1½-ton.
Nash Motors Co., Kenosha, Wis.—1 & 2-ton.
Nelson Motor Truck Co. See Jumbo.
Nelson & LeMoon, Chicago.—1½, 2, 3½ & 5-ton.
Netco—New England Truck Co., Fitchburg, Mass.—2 & 2½-ton.
New England Truck Co. See Netco.
Niles (Ohio)—Niles Car & Mfg. Co., Niles, O.—1 & 2-ton.
Niles (Pa.)—Niles Motor Truck Co., Pittsburgh, Pa.—2-ton.
Noble Motor Truck Co., Kendallville, Ind.—1, 1½, 2½ & 3½-ton.
Northway Motors Co., Natick, Mass.—2 & 3½-ton.
Northwestern—Star Carriage Co., Seattle, Wash.—1½ & 2-ton.
Norwalk Motor Car Co., Martinsburg, W. Va.—1 & 1½-ton.

O

O'Connell Motor Truck Co. See Super Truck.
Ogden Motor & Supply Co., Chicago.—1 & 2½-ton.
O. K.—Oklahoma Auto Mfg. Co., North Muskogee, Okla.—1½ & 3-ton.
Oklahoma Auto Mfg. Co. See O. K.
Old Hickory—Kentucky Wagon Co., Louisville, Ky.—¾ & 1-ton.
Old Reliable Motor Truck Co., Chicago.—1½, 1, 1½, 3½ & 5-ton internal-combustion and
Oldsmobile—Olds Motor Wks., Lansing, Mich.—¾-ton.
Olds Motor Works. See Oldsmobile.
Olympic Motor Truck Co., Tacoma, Wash.—2-ton.
Oneida Motor Truck Co., Green Bay, Wis.—1, 1½, 3½ & 5-ton internal combustion and 2-ton electric.
Oshkosh Motor Truck Mfg. Co., Oshkosh, Wis.—2-ton.
One Wheel Truck Co. See Autohorse.
Overland—Willys-Overland Co., Toledo. O.—800-pound.

P

Packard Motor Car Co., Detroit, Mich.—1½, 2, 3, 4, 5 & 6-ton.
Paige-Detroit Motor Car Co., Detroit, Mich.—2½ & 3½-ton.
Palmer-Meyer Motor Car Co., St. Louis, Mo.—1 & 2-ton.
Parker Motor Truck Co., Milwaukee, Wis.—2, 3½ & 5-ton.
Patriot—Hebb Motors Co., Lincoln, Neb.—¾, 1½ & 2½-ton.
Piedmont Motor Car Co., Lynchburg, Va.—1 & 1½-ton.
Pierce-Arrow Motor Car Co., Buffalo, N. Y.—2 & 5-ton.
Pioneer—All Steel Truck Co., St. Louis, Mo.—2-ton.
Pittsburgher—Pittsburgh Truck Mfg. Co., Pittsburgh, Pa.—2½-ton.
Pony—Minnesota Machinery & Foundry Co., Minneapolis, Minn.—500-pound.
Power Truck & Tractor Co., Detroit, Mich.—2-ton.

R

Rainier Motor Corp., Flushing, L. I., N. Y.—¾, 1, 1½ & 2-ton.
Ralston Iron Works. See Hewitt-Ludlow.
Reliance Motor Truck Co., Appleton, Wis.—1½ & 2½-ton.
Reo Motor Car Co., Lansing, Mich.—¾-ton.
Republic Motor Truck Co., Alma, Mich.—¾, 1, 1½, 2½ & 3½-ton.
Reynolds Motor Truck Co., Mt. Clemens, Mich.—1½, 2½, 3½ & 5-ton.
Riker—Locomobile Co., Bridgeport, Conn.—3 & 4-ton.
Rock Falls Mfg. Co., Sterling, Ill.—1¼-ton.
Rowe Motor Mfg. Co., Lancaster, Pa.—2, 2½, 3 & 5-ton.

S

Sandow Motor Truck Co., Chicago.—1, 1½, 2, 2½, 3½ & 5-ton.
Sanford Motor Truck Co., Syracuse, N. Y.—2½, 3½ & 5-ton.
Schacht Motor Truck Co., Cincinnati, O.—2, 2½, 3½ & 5-ton.
Schleicher Motor Vehicle Co., New York City.—3 & 5-ton.
Schwartz Motor Truck Co., Reading, Pa.—1½, 2¼ & 5-ton.
Selden Truck Corp., Rochester, N. Y.—1½, 2½, 3½ & 5-ton.
Seneca Motor Truck Co., Fostoria, O.—½-ton.
Service Motor Truck Co., Wabash, Ind.—1 1½, 2½, 3½ & 5-ton.
Shaw Corp. (Walden W.), Chicago.—2-ton.
Signal Motor Truck Co., Detroit, Mich.—1 1½, 2, 3½ & 5-ton.
Southern Truck & Car Corp., Greensboro, N. C.—1, 1½ & 2-ton.
Standard Motor Truck Co., Detroit, Mich.—1, 2, 3½ & 5-ton.
Star Carriage Co. See Northwestern.
Steele (W. W.), Worcester, Mass.—2, 3, 4 & 5-ton.
Sterling Motor Truck Co., Milwaukee, Wis.—1½, 2½, 3½, 5 & 7½-ton.
Stewart Motor Corp., Buffalo, N. Y.—¾, 1, 1½, 2 & 3½-ton.
Stoughton Wagon Co., Stoughton, Wis.—1½, 2 & 2½-ton.
Sullivan Motor Truck Corp., Rochester, N. Y.—1½, 2 & 3½-ton.
Superior Motor Truck Corp., Atlanta, Ga.—1 & 2-ton.
Super Truck—O'Connell Mtor Truck Co., Waukegan, Ill.—2½, 3½ & 5-ton.

T

Texan—Texas Motor Car Assn., Ft. Worth, Tex.—¾ & 1½-ton.
Tiffin Wagon Co., Tiffin, O.—1½, 2½, 3½, 5 & 6-ton.
Titan Truck Co., Milwaukee, Wis.—2½, 3½ & 5-ton.
Tower Motor Truck Co., Greenville, Mich.—1½, 2½ & 3½-ton.
Traffic Motor Truck Corp., St. Louis, Mo.—2-ton.
Transport Motor Truck Co., Mt. Pleasant, Mich.—1, 1½ & 2-ton.
Traylor Engineering & Mfg. Co., Cornwells, Pa.—1, 1½ & 2½-ton.
Triangle Motor Truck Co., St. Johns, Mich.—¾, 1½, 2 & 2½-ton.
Triumph Truck & Tractor Co., Kansas City, Mo.—2-ton.
Twin City Four Wheel Drive Co., St. Paul, Minn.—3½ & 5-ton.
Turnbull Motor Truck & Wagon Co. See Defiance.

U

Ultimate—Vreeland Motor Truck Co., Newark, N. J.—1½ & 2½-ton.
Union Motor Truck Co., Bay City, Mich.—2½ & 4-ton.
United Motors Co., Grand Rapids, Mich.—1½, 2½, 3½ & 5-ton.
United States Motor Truck Co. See U. S.
Universal Service Co., Detroit, Mich.—1½, 2 & 3-ton.
U. S.—United States Motor Truck Co., Cincinnati, O.—1½, 2½, 3½ & 5-ton.

V

Velie Motor Corp., Moline, Ill.—1½-ton.
Victor (Ill.)—Victor Motor Truck & Trailer Co., Chicago.—1½ & 2-ton.
Victor (Mich.)—Victor Truck Co., St. Joseph, Mich.—1½ & 2-ton.
Vim Motor Truck Co., Philadelphia, Pa.—½, 1, 2 & 3-ton.
Vreeland Motor Co. See Ultimate.

W

Walker Vehicle Co., Chicago.—½, 1, 2, 3½ & 5-ton electric.
Walker-Johnson Truck Co., Woburn, Mass.—2½-ton.
Walter (Wis.)—Milwaukee Locomotive Mfg. Co., Milwaukee, Wis.—5-ton tractors.
Walter (N. Y.)—Walter Motor Truck Co., New York City.—3 & 5-ton.
Ward Motor Vehicle Co., Mt. Vernon, N. Y.—½, ¾, 1, 2, 3½ & 5-ton electric.
Ward LaFrance Motor Truck Co., Elmira, N. Y.—2½, 3½ & 5-ton.
Watson Products Corp., Canastota, N. Y.—¾, 1½, 2½ & 3½-ton.
Wells—Evans Truck & Axle Co., Auburn, Ind.—2-ton.
White Co., Cleveland, O.—¾, 2, 3 & 5-ton.
White Hickory Wagon Mfg. Co., East Point, Ga.—1½-ton.
Wichita Falls Motor Co., Wichita Falls, Tex.—1½, 2, 2½, 3½ & 6-ton.
Wilcox Motor Co. (H. E.), Minneapolis, Minn.—1, 1½, 2½, 3½ & 5-ton.
Willys-Overland Co. See Overland.
Wilson Co. (J. C.), Detroit, Mich.—1½, 2½, 3½ & 5-ton.
Winther Motor Truck Co., Kenosha, Wis.—1½, 2, 2½, 3½, 5 & 7-ton.
Witt-Will Co., Washington, D. C.—1, 1½ & 2½-ton.
Wolverine—American Commercial Car Co., Detroit, Mich.—1½-ton.

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YOU can depend upon *good* equipment in emergency.

No delays—fewer repairs—more real mileage—when your busy apparatus rolls on UNITED STATES SOLID TRUCK TIRES. Fire fighting officials everywhere, unanimously declare that—

United States Tires are Good Tires

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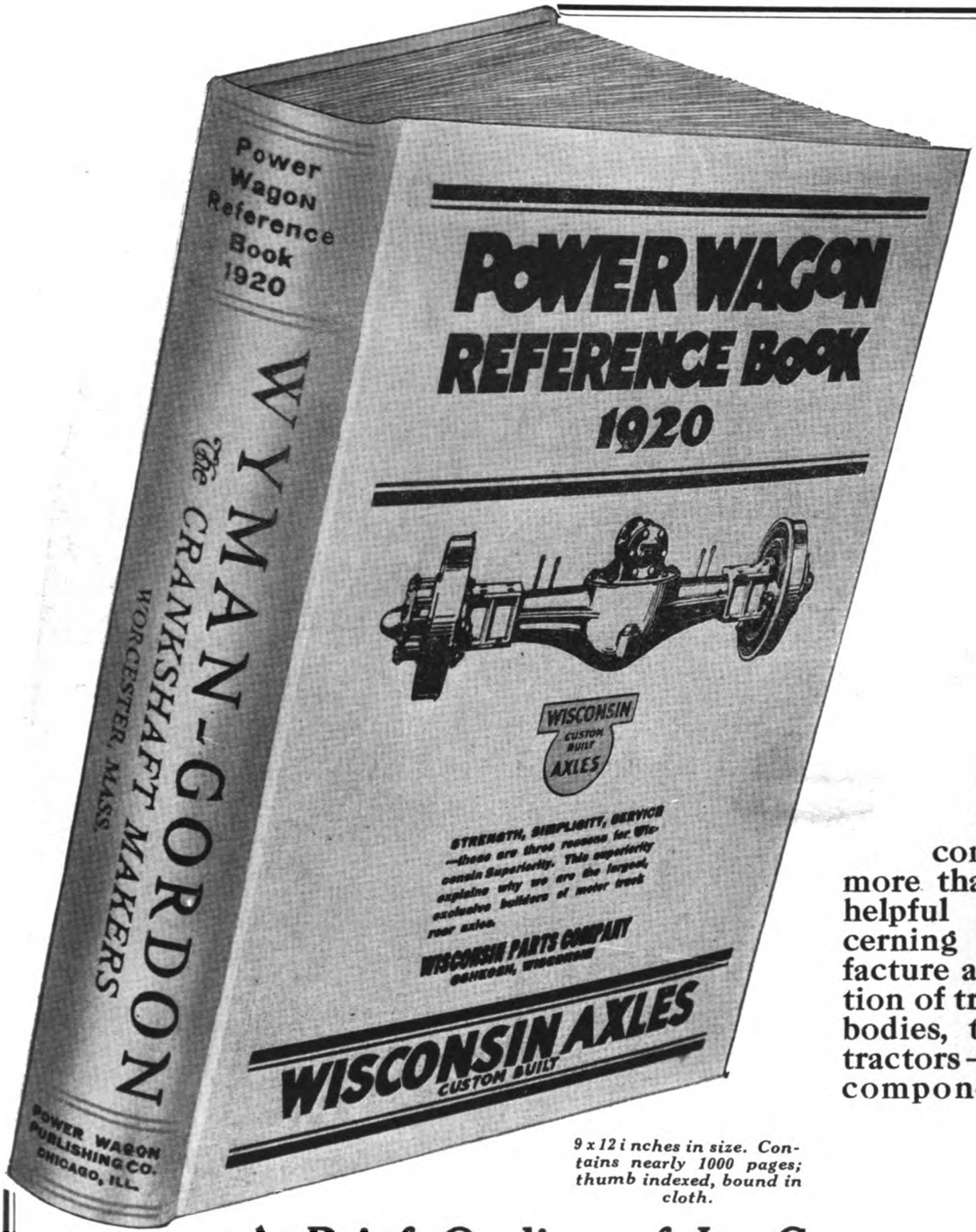

It contains more than 700,000 helpful facts concerning the manufacture and application of trucks, truck bodies, trailers and tractors—and their component parts.

9 x 12 inches in size. Contains nearly 1000 pages; thumb indexed, bound in cloth.

A Brief Outline of Its Contents

Specifications

"Reference Book" Specifications are not limited to a statement of the makes of the various parts used in the construction of Motor Trucks, Farm Tractors and Trailers. They include dimensions of all kinds—detailed technical descriptions of the parts themselves. The 125,000 separate facts contained in these tables are so conveniently arranged that it is unnecessary to turn the book in order to read the various column headings. Everything can be seen at a glance—a helpful feature that is to be found **only** in the "Reference Book."

Blue Prints

The book contains 156 pages of blue prints printed in color. Every drawing was prepared with great care and at heavy cost by our technical department from prints and original data secured from the manufacturers. These prints cannot be found in any other publication. They afford the reader an accurate and true view of design and construction, and illustrate many important features of the machines displayed that could not be shown as well by any other means. The blue print section will be of great value to dealers and manufacturers.

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The 1920 Reference Book

This book answers many vitally important questions. It is a compendium of facts and figures pertaining to the industry—an encyclopedia of construction and design—a text book on trade practices—an authority on the economic application of motor trucks and trailers. It is your book—compiled and edited for you—so that you might have the facts at your command when you need them. It is the most complete and the most frequentily used book of facts ever printed for the trade. The text is thumb-indexed and sectionalized for immediate reference.

Motor Trucks

There are 582 different models of motor trucks on the market. The "Reference Book" contains the most complete and the most detailed set of motor truck specifications ever printed. These cover every important feature of design and construction.

113 full page blue prints of the principal trucks on the market are printed in color.

The 103 pages describing the operation of motor trucks in the principal lines of trade offer an intensely interesting and highly instructive feature for the individual who needs facts on Transportaton costs and problems. These studies of operation—prepared at great cost—contain the vital facts about the economy of the machine—and coupled with each study are tables illustrating the extent of motor truck application in each important field. This latter information is tabulated by states, and by the size of machines employed. To the sales executive these tables represent an authoritative guide to market. They explain market development and illustrate the future possibilities. The progressive, thinking man will find these tables worth a great many times the cost of the entire book.

Bodies

Did you know that there are over 100 different types of motor truck bodies?

The Body Section of the "Reference Book" is the most complete and the most detailed exposition of the types on the market ever presented. You will find illustrations of practically every type, from the simple platform body to the complicated combination elevating and dumping body. The truck chassis dimensions are given in the greatest detail and printed in the most convenient form. The dealer and the manufacturer alike will find continuous profit in the use of this section. It will help **you sell trucks.**

Trailers

Did you know that there are 432 different models of Trailers on the market?

You cannot afford to be without full information concerning this big industry. How and where are all these Trailers used? Is money to be made selling them or manufacturing them? Can the sure profit through their use, and just what are the facts about the economical application of Trailers? The "Reference Book" will give you the facts—the specifications and 20 pages of blue prints of the principal models.

Farm Tractors

Can the motor truck dealer sell tractors and make money? The "Reference Book" presents a clear cut view of this industry. It prints lists of the manufacturers and what they make—the specifications of all models and about 20 pages of blue prints.

The dealer will get a first hand study of power farming—of how the Tractor is applied—how it has increased the farmer's efficiency and reduced his cost of production—it even goes further—it explains the many other uses of the tractor, and unfolds the great sales possibilities that this field offers the automotive dealer. Do you guess—or will you get the facts from the "Reference Book"?

Electric Trucks

What are the developments, the economies, and the future of this type of machine?

The largest individual user of electric trucks in America tells what electric trucks have done in his organization, and presents some interesting facts never before published. The Electric Truck Section contains specifications of all models on the market, blue prints, and the most thorough article on their application ever printed.

Passenger Cars

For the convenience of dealers interested in Passenger Cars, the list of vehicle and parts manufacturers, and the specifications of the various machines on the market, are presented in the most convenient form.

Parts

Over 700 concerns make parts for the manufacturers of the finished trucks, trailers and tractors. The "Reference Book" not only describes the important parts that go into the finished vehicles, but it tells you something about the organizations that make them—the number of employees—the size of the plant—the length of time in business, etc. A powerful sales help, and a useful guide to the purchase of material.

Facts and Figures

How much has production of Motor Trucks increased by years since 1904?

The "Reference Book" contains facts and figures on production, distribution, weights and dimensions of commodities hauled—in fact it presents reliable data on every important phase of the construction, design, application and sale of the product of the industry. It is the indispensable handbook of the progressive element of the trade.

How to get the book

The "Reference Book" is sold only in conjunction with a yearly subscription to the "Power Wagon," the industry's oldest and most progressive trade journal. Each month, beginning with the April issue, the "Power Wagon" will print the latest specifications of all motor trucks.

To get the Power Wagon Reference Book simply mail us your check for $5.00. If you are already a subscriber to the Power Wagon, your subscription will be extended for the period of one year from expiration of your present subscription.

Don't be without this valuable service. You may need some of the "Reference Book" information very badly tomorrow. Help us give you maximum service.

Order Yours Today

Power Wagon Publishing Company

544 Lake Shore Drive **Chicago, Illinois**

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Ace MOTOR TRUCKS

No Busted Bubbles Here

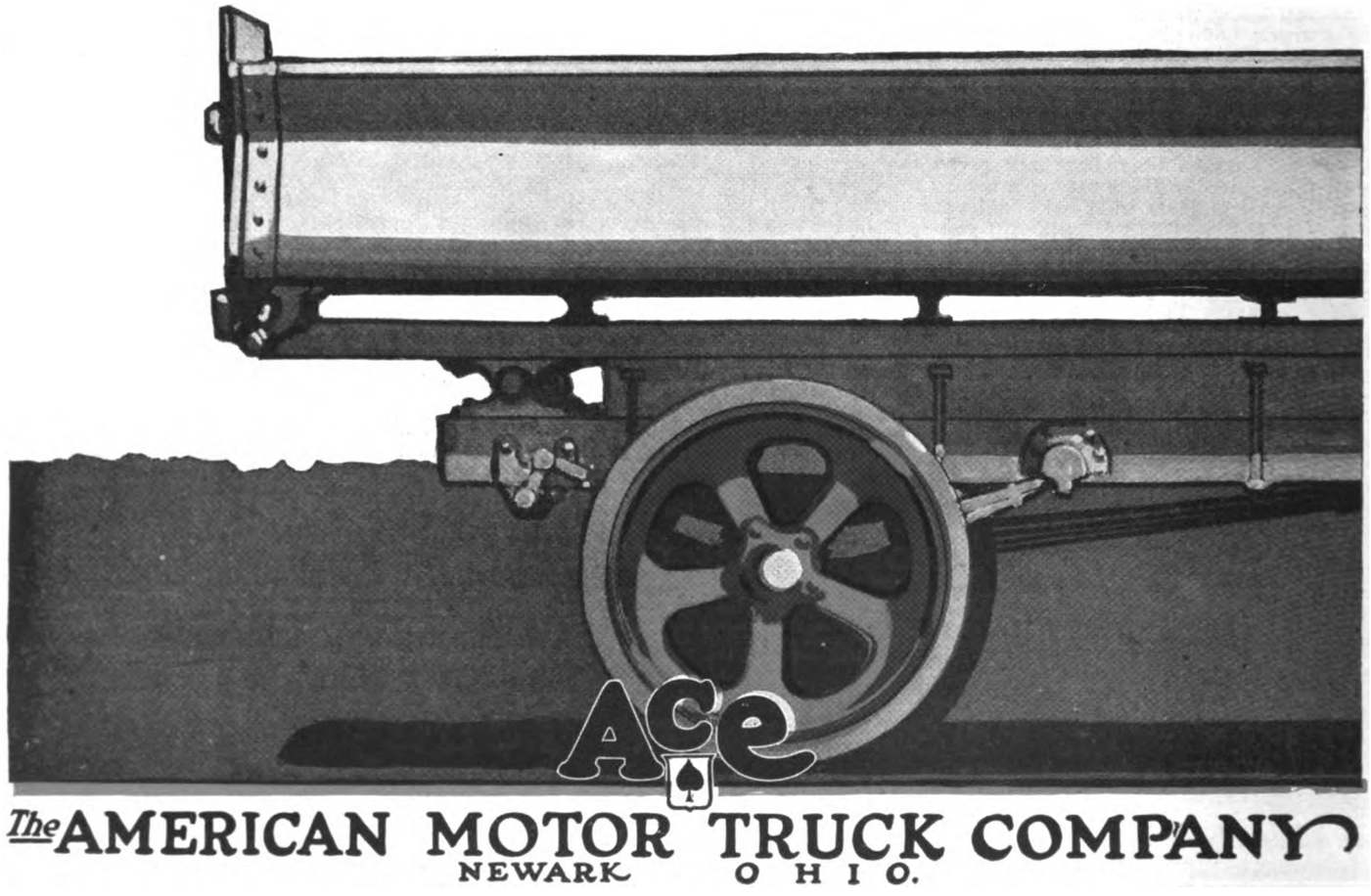
A truck isn't sold until it is delivered. Paper prospects can't be deposited at the Bank. Buyers want Trucks, not promises. Every prospect on your list may also be a prospect on ten other Dealers' lists, and the first Dealer that delivers the Truck cancels the chances of the other ten Dealers.

Ace Dealers Deliver

We have kept our Dealer list down to the measure of our production. Our production has steadily gone up with the requirements of our Dealers. We are now able to take on additional territory and will continue to accept new Dealers according to our ability to deliver Ace Trucks.

The First Completely Equipped Truck

To us, a chassis is an unfinished Truck. We originated the idea of the finished Truck, and would have delivered finished Trucks two years ago if the war hadn't been on. Ace Trucks are complete, ready for load, driver and road. Electric self starter, self-tracking electric lights, battery or magneto ignition, optional, steel wheels, steel bumper, governor, odometer, horn, sectional radiator with military guard, all-weather cab built in, and the entire Truck fully painted. No accessories to buy, no delay to fit up for service, and no matching up to make the unit fit.



The AMERICAN MOTOR TRUCK COMPANY
NEWARK OHIO.

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Specifications

Modine Spirex Sectional Radiator
Timken-Detroit or Sheldon Front Axle
Buda Motor
Atwater-Kent Distributor
Merchant & Evans Multiple Dry Disc Clutch
Cotta Transmission
Cotta Control
Ross Steering Gear
Merchant & Evans Universal Joints
Timken-David Brown Worm Drive or Sheldon Rear Axle
Mather Springs
Parish & Bingham Frame
Dayton Steel Wheels (on 2½ ton model)
Schwarz Wooden Wheels (on 1½ ton model)
Firestone Solid Tires or Goodyear Pneumatic Tires

Extra Standard Equipment

All Weather Cab
Military Radiator Guard
Channel Steel Bumper
Westinghouse Self-Starter
Westinghouse Generator
Self-Tracking Electric Lights with Dimmers
Exide Battery
Veeder Odometer
Klaxon Horn
Fully Painted
Pierce Governor

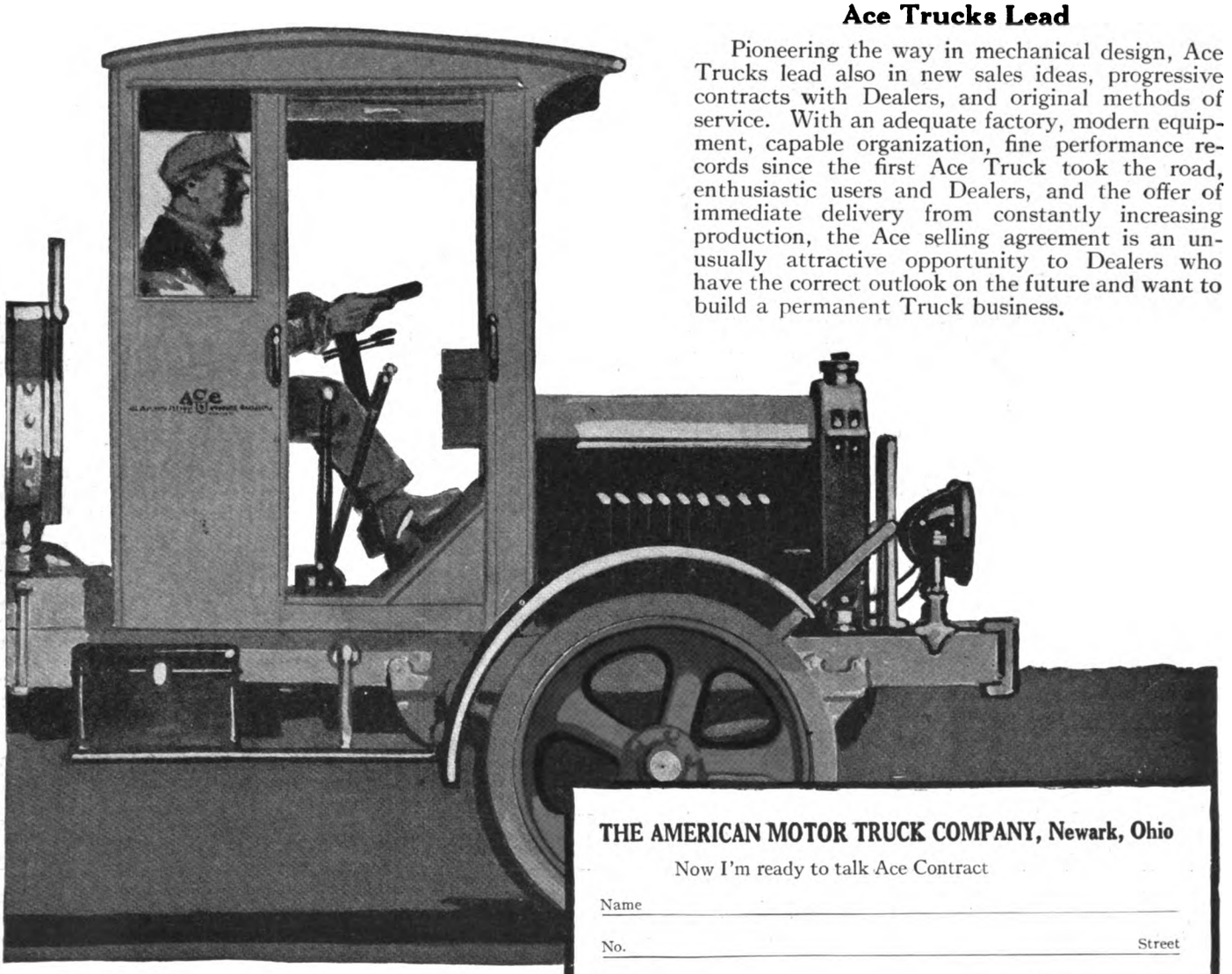
1½-ton Standard - - - -	$3100.00
1½-ton Pneumatic - - -	3450.00
2½-ton Standard - - - -	3800.00
2½-ton Pneumatic - - - -	4250.00
2½-ton 144″ Wheel Base - -	3800.00
2½-ton 180″ Wheel Base Solid Tires	3950.00
2½-ton 180″ Wheel Base Pneumatic	4400.00
3½-ton Standard - - - -	4500.00
3½-ton Pneumatic - - - -	5150.00
3½-ton Long Wheel Base - -	4650.00
3½-ton Long Wheel Base Pneumatic	5250.00

Universal Acceptance

The Ace idea of complete, standard, integrated equipment won the immediate acceptance of the user. Wise Dealers saw that the idea was correct. Manufacturers are rapidly admitting it in their new plans.

Ace Trucks Lead

Pioneering the way in mechanical design, Ace Trucks lead also in new sales ideas, progressive contracts with Dealers, and original methods of service. With an adequate factory, modern equipment, capable organization, fine performance records since the first Ace Truck took the road, enthusiastic users and Dealers, and the offer of immediate delivery from constantly increasing production, the Ace selling agreement is an unusually attractive opportunity to Dealers who have the correct outlook on the future and want to build a permanent Truck business.



THE AMERICAN MOTOR TRUCK COMPANY, Newark, Ohio

Now I'm ready to talk Ace Contract

Name _____

No. _____ Street

City _____ State _____

(P.W.—5-20)

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A Lesson in Truck Salesmanship

Convincing Argument to Landlords Paves Way for Sale of Six 5-ton Ice-delivering Machines After Deal Had Become Almost Hopeless

WHILE every industry has its own peculiar problems which make it necessary for the motor truck dealer to have data bearing on each separate line of business, it is safe to say that as a rule, business is pretty well sold on the motor truck idea, and that it is frequently not a question of whether to buy a machine, but merely what kind of a power wagon to buy. In most instances, there is no necessity for missionary work to convert the prospect to the efficiency of the motor truck. The dealer need merely show why his particular machine is best adapted to meet the problems of the prospective purchaser. This means that the trade is cashing in on the work of the past few years.

However, an occasional exception to this rule is encountered, and a well-known Middle-Western dealer recently encountered such a snag in the shape of a big ice company. The head of the company was a live young business man, always ready to be shown something new, but still unconverted to the subject of motor trucks. The dealer's arguments were in vain. On one of his visits to the ice plant, the president took the salesman by the arm and led him out in the street.

"See that apartment building?" he queried. "There are fifty families in there, and we deliver ice to all of them. That is just one out of a hundred such buildings that we deliver to. Our drivers spend at least an hour in each building, delivering the ice and collecting for it and worrying with dumb waiters and irate ladies who have been summoned from their beauty sleep to get the ice out of the dumb waiter.

"THE ice business, as far as we are concerned, isn't a question of long hauls. It is a question of spending time at each apartment, and our hoses have plenty of time to rest up while our drivers are doing this delivering. It is probably true that the motor truck would be as efficient as the horse, but we have horses and wagons, and so far you haven't been able to prove that it would pay us to sell the horse-drawn vehicles and install motor trucks. I'm as ready to listen to a business proposition as anyone, but the apartment building situation makes horses as good as motor trucks for us."

The dealer went away thinking about this objection, and looking for a little light. It finally came from an utterly unexpected source, as hints sometimes do. The dealer's wife, scanning the "for rent" columns of a daily paper, exclaimed one night: "Oh, Jim, Spink's new apartment building is to have everything complete. They are going to furnish heat and light and telephone service, and even the ice. I'd love to live there. It would be so convenient."

The motor truck dealer, after a dazed moment, stepped on his mental accelerator, and exceeded all speed limits for thinking in the next few minutes. Then he laughed.

"Friend Wife," he said, "you have just earned anything you want. By all means, go out and get a lease on one of the new apartments, if such a thing is possible these days."

The motor truck man was extremely busy during the next few days. On the fourth he called on his friend, the ice man.

"In the market for a few motor trucks?" he asked.

The ice executive looked at him for a few minutes.

"I DON'T see how you worked it, if you did work it," he said. "But I believe we are good prospects at that. Most of the apartments on our routes have notified us that beginning with the first of next month all we need do is to deliver a certain amount of ice to the back door of the building, and the janitor will do the detail work of delivering the proper amount to each apartment. This means that we merely drop off a ton or so at the building, and drive on. It speeds up collections, too, for instead of having to collect from each individual tenant, we merely keep track of the total consumed by each building, and bill the landlord at the end of the month. He sends us a check to cover the total, simplifying our bookkeeping amazingly. In short, we can devote our efforts to making ice, with a minimum to hanging around apartment buildings, which have always been one of our big troubles. I don't know whether or not you had a finger in this, but if you did, you have certainly earned a sale or two."

And the result was that the ice company bought six 5-ton motor trucks.

The dealer, of course, had engineered the deal, which turned out to be exceedingly simple. He found that most of the apartment buildings were in the hands of a few corporations, keenly alive to the necessity for efficiency of operation. The tendency among these corporations already was to give all of the service possible, including its cost in the monthly rental, and all that was necessary was for the motor truck dealer to point out that tenants had to have ice, and that the landlord was the logical man to provide it.

The apartment owners saw the point at once. They have had problems of their own. Some have had a sliding scale of rental, depending on the season. The summer rate was lower than the winter. Janitors, who were fairly busy in the winter, firing furnaces, had little to do in the summer, but the landlords found it difficult to reduce their pay. In addition, there was a very real desire to assume supervision of the service to tenants, so that it could be kept up to a certain standard. The giving of ice, telephone service, and other necessities simplified the problem for the landlord as well as the tenant. The latter writes out one check monthly to take care of all household incidentals. The janitor takes care of the delivery of ice, and has work to do in the summer as well as the winter. The rental for apartments is balanced, being the same for summer and winter, because heat is given in the winter and ice in the warm months. The landlord gets the wholesale rate for ice, and a blanket rate on telephone service, and current for light and fuel. In short, the whole plan of apartment building operation is put on a more economical and efficient basis.

The tendency toward this method is already evident in the partment field, and it is a simple matter for motor truck dealers to expedite this inclination by simply pointing out the facts. Owners of apartment buildings are always quick to realize the advantages of the method of providing maximum service under a single rental charge.

THE same problems which confronted the ice company referred to are shared in a large measure by other concerns delivering to apartment buildings, such as laundries, milk companies, etc. The success of the plan in the ice field suggests that it might be adapted to others. If an apartment owner finds it worth while to deliver ice, why not the morning bottle of milk and the weekly bundle of the laundry referred to as "rough dry"? If he would assume this responsibility, it would simplify the work of the laundries and milk companies, particularly in the transportation departments. The efficient power wagon is the moving power wagon, as these companies realize fully. The long stops made at apartment buildings have militated against true efficiency of motor truck operation, and an elimination of these stops will send motor truck stock much higher above par than it is now.

Butterfield With H-S

The Herschell-Spillman Motor Company, North Tonawanda, New York, announces the appointment of C. W. Butterfield, as sales manager. Mr. Butterfield has for the past four years been connected with the Dyneto Electric Corporation, Syracuse, makers of automotive products, occupying the position of sales and service manager. He has had a number of years' experience in sales promotion work, at one time being associated with the Brown-Lipe Chapin Company, Syracuse, and the J. Walter Thompson Advertising Agency, Detroit.

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Hydro Hoist Meets Need

(Continued from page 28)

which show how each outfit is to be mounted.

Each hoist before being shipped out is placed in a test rack and pressure applied. The following table shows that the test is more than double the maximum amount of the rated load, yet this only approximates what the hoists can lift. A stock hoist can lift over fifteen tons; the other hoists more in proportion:

Hoist.	Lbs. pressure per sq. in.	Bore of cylinder.	No. of cylinders.	Tested lifting force.	For chassis.
No. 4	350	4¾	2	12,400	Up to 3 tons
No. 5	400	5¾	2	23,400	3½ to 5½ tons
No. 6	450	7	2	34,650	6 to 10 tons
No. 7	350	7	1	13,475	8 tons, incl.

The increased loading space made possible by the location of the hoist under the body is of decided importance to all motor truck users. It makes it possible to use all the space back of the cab and and gives proper load distribution. It also makes possible the use of a body with lower sides for a given capacity, thus making the motor truck easier to load. The method of installing the hoist is comparatively simple. Power is taken from the front propeller shaft or transmission amidship and is applied directly to the pump drive, by means of a shaft and universal joints. All parts on the hoist are standardized and interchangeable. Gears are made of high grade steel.

Omnibuses in Palestine

As a means of transportation the slow-going camel has had his day, and is gradually being replaced by more modern methods of travel on the streets of Jerusalem. If the new order of things holds out that city will soon have a Fifth Avenue thoroughfare crowded with omnibuses. There is a very evident demand for increased transportation facilities in that very ancient city. To meet this demand, the Remallah Company, of Jerusalem and New York, recently shipped several Rainier motor trucks fitted with special omnibus bodies to accommodate 25 passengers. It was said at the New York office of the company that this was but the forerunner of a large fleet of Rainier omnibuses soon to be seen on the streets of Jerusalem.

A representative of the company said: "The problem of transportation not only in Jerusalem but throughout Palestine is acute. The railroads are few in number and uncertain in their schedules. Most of the passenger service of these roads was suspended during the war except for the use of troops. These roads are now in such a condition as to make other means of transportation necessary. The English since their occupation have been building up the important ports of Palestine and are planning to operate a fleet of motor trucks to these places to accommodate the influx of tourists to the birthplace of Christianity and to accommodate commercial travelers. We are also planning to operate a service from Jerusalem to Damascus in Syria."

Nusslock with Master

F. P. Nusslock, formerly district sales manager and organizer for the Gramm-Bernstein company, has joined the Master Trucks, Inc., as special factory representative. For the past ten or twelve years he has devoted his entire time and attention to manufacturing and selling and his past experience in the territory studying conditions, his factory experience and his thorough knowledge of motor truck construction and mechanical features fits him especially for this position.

Where is the economy in trying to speed up farm production and then impede the movement of food supply by a halt in the construction of modern roads over which that supply must be hauled?

REPORT BY COUNTIES SHOWING MOTOR VEHICLE AND TRAILER REGISTRATIONS FOR 1919 AUTOMOBILE YEAR IN NEW YORK.

Counties.	Motor Wagons.	Omnibuses.	Passenger cars.	Total Motor Vehicles.	Trailers.
Bronx	2,598	945	9,418	12,961	26
Kings	11,810	1,415	43,126	56,351	162
New York	21,893	5,839	54,070	81,802	391
Queens	3,785	652	16,030	20,467	89
Richmond	971	285	4,106	5,362	10
Total New York City.	41,057	9,136	126,750	176,943	678
Albany	2,231	298	7,536	10,065	52
Allegany	290	101	3,526	3,917	14
Broome	1,071	176	6,929	8,176	32
Cattaraugus	548	136	4,592	5,276	25
Cayuga	562	87	4,764	5,413	19
Chautauqua	1,017	147	6,991	8,155	25
Chemung	647	74	4,268	4,989	4
Chenango	414	123	3,069	3,606	14
Clinton	282	171	2,667	3,120	5
Columbia	535	129	2,836	3,520	5
Cortland	256	38	2,792	3,086	9
Delaware	605	253	3,890	4,748	35
Dutchess	1,437	307	5,294	7,038	21
Erie	8,509	709	37,472	46,690	313
Essex	461	329	2,409	3,199	4
Franklin	428	225	2,767	3,420	4
Fulton	544	113	2,997	3,654	13
Genesee	387	83	3,548	4,018	25
Greene	496	462	1,786	2,944	7
Hamilton	38	76	221	335	...
Herkimer	540	172	4,716	5,428	23
Jefferson	866	380	6,526	7,772	70
Lewis	218	106	2,169	2,493	19
Livingston	413	95	3,868	4,376	5
Madison	350	132	3,424	3,906	23
Monroe	3,919	457	23,226	27,602	87
Montgomery	601	82	3,173	3,856	14
Nassau	2,490	635	12,817	15,942	90
Niagara	1,608	157	6,691	8,456	59
Oneida	1,634	300	10,680	12,624	81
Onondaga	2,696	175	15,087	17,958	120
Ontario	675	121	4,936	5,732	14
Orange	1,681	486	7,642	9,809	16
Orleans	327	40	2,998	3,665	28
Oswego	662	118	4,795	5,575	46
Otsego	471	140	3,936	4,547	13
Putnam	233	70	1,181	1,484	3
Rensselaer	1,281	259	5,177	6,717	11
Rockland	640	208	2,726	3,574	14
St. Lawrence	591	384	6,366	7,341	30
Saratoga	595	272	3,058	3,925	10
Schenectady	899	121	5,815	6,835	23
Schoharie	265	141	1,674	2,080	...
Schuyler	107	41	972	1,120	4
Seneca	158	41	1,866	2,065	2
Steuben	587	133	6,003	6,723	29
Suffolk	2,084	779	10,078	12,941	118
Sullivan	455	930	1,966	3,351	8
Tioga	162	52	1,707	1,921	8
Tompkins	373	124	3,248	3,745	10
Ulster	917	573	4,310	5,800	17
Warren	332	208	2,200	2,740	16
Washington	323	114	2,155	2,592	4
Wayne	659	98	4,759	5,516	27
Westchester	4,015	860	20,043	29,918	55
Wyoming	276	73	2,924	3,273	9
Yates	182	38	1,889	2,109	11
Foreign	1,226	184	2,688	4,098	39
	97,346	22,572	446,593	565,511	2,470

New Trade Literature

The rapid strides in the development of power farming machinery during the past few years have been such as to make the engineering text-books on the subject more or less obsolete. Probably no other phase or development in this line offers a more accurate index to present tendencies in design as the growing popularity of high-grade anti-friction bearings in such machines.

The tractor bearings division of the Hyatt Roller Bearing Company has taken an unusually active interest in the development of farm machinery along lines of greater efficiency, and in order to convey the results of its experience to the engineering fraternity, it has instituted a unique system of disseminating technical information. A loose-leaf hand book is being distributed into which a series of engineering bulletins may be properly preserved. It is contended that such data issued by piecemeal is more valuable to the trade right now than a complete text would be at an indefinitely later date.

The first installment of the series includes four independent bulletins as follows: "Bearings for Tractors," "Bearings for Tillage Implements," "Bearings for Belt Driven Farm Machines," and "Tractor Dynamometer Tests." The subjects are treated from a practical, rather than a theoretical standpoint. Intricate mathematical calculations are carefully avoided. The recommendations are based on the conviction that experience in the field is the only safe guide to correct design. The bearing requirements for different positions on the tractor and other machines are carefully analyzed, and specific applications from current practice are illustrated and discussed.

The bulletin on tractor bearings takes a conventional type of tractor and analyzes its bearing requirements from start to finish, giving a series of tables right in the text listing the bearings suitable for each specific application. Subsequent bulletins will deal with other types of tractors

The bulletin devoted to implements points out that with the higher speeds and uninterrupted operation possible with the modern gas tractor, the demands upon the implement are much more severe than formerly.

The illustrations are taken from what have been found to be the best practice in the field under general soil conditions, due consideration being given to economical manufacturing. The applications of roller bearings to land wheels, furrow wheels, rolling coulters, gauge wheels, disk harrows, soil pulverizers, and grain drills are shown.

In the bulletin on belt-driven machines, the advantages of anti-friction bearings are again emphasized. The machines covered include threshers, silo fillers, husker shredders, corn shellers, hay presses, feed grinders, grain drills, wood saws, etc.

The bulletin devoted to dynamometer tests describes the construction and the use of the dynamometer and the methods of computing results from such tests.

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Motor Truck and Railroad Freighting

By W. J. L. BANHAM
General Traffic Manager, Otis Elevator Company

USERS of motor trucks should consider to what extent they can be operated in competition with short-haul freight movement. The principles involved are: First, service; second, cost.

There seems to be no question at the present time that the carrying of less than carload shipments to short-haul points by the rail carriers is not only expensive to the shippers, but is also unprofitable to the carriers. Until recently it seemed to be almost necessary for the shippers to use the rail carriers for the movement of their less than carload shipments to nearby points, regardless of expense and delay, as there did not seem to be any organized effort made by the motor truck operators to take care of this class of freight.

It is extremely difficult for the carriers to figure cost of transportation of package freight hauled short distances and particularly to such points at which they do not have a through car movement. The expense of transferring the less than carload shipments one or more times when moving within fifty miles of the receiving station, and the additional expense caused by delay of equipment, has been recognized by the government, with the result that the United States Railroad Administration during the war ruled that freight destined within a certain radius would not be handled by the rail carriers. It was necessary, therefore, for the shippers to find other means of transporting this class of freight. Motor truck transportation, while still in its infancy at the present time, pointed a way to the shippers whereby their less than carload shipments could be handled not only more promptly, but at a considerable saving both to the shipper and to the receiver of freight alike.

WHILE it is true that it is almost impossible for the carriers to figure the exact cost of handling short-haul freight, it is equally as difficult for the shippers to ascertain the cost of transporting similar freight. The question of cost brings me to the first part of my subject, and in order to make it clear as to what I mean by costs and what these costs cover, I am going to refer to them as transportation costs. Transportation costs do not necessarily mean less than carload freight rates and motor truck rates, although both rates are a part of the transportation costs.

What I understand to be a true transportation cost is all expense involved in making a shipment, starting with the boxing or packing expense, together with handling expense in the shipping department, the loading of freight on teams for delivery to the freight house, teaming charges from the shipping department to the local freight house, and additional labor incidental thereto. To this must be added the less than carload freight rate and additional charge for cartage at the delivery point, with such other expenses that may be caused by requests for tracing, duplication of shipments lost or damaged in transit, entering of claims, checking of freight bills, delay to shipments in transit, and the expense of carrying additional stock to take care of freight in transit when moving via rail carriers. All of these costs are properly transportation costs, and are part of the shipping expenses which are paid either by the shipper or receiver.

If you will make an analysis of the charges covering your shipments it will be of interest to you to know the amount it costs to make less than carload shipments, and if you will compare these costs against the same shipments moving via motor truck, you should be in position to eliminate a number of the cost items, by reason of the fact that it is not necessary to go to the same expense for packing or boxing freight shipments when moving via motor truck, inasmuch as there is usually no transfer in transit. For the information of motor truck users I have compiled some figures showing the cost of freight movement, compared with the same movement via motor truck. These figures are worked out on an average basis.

IN practically every instance, it is necessary to prepare material for freight shipment in an entirely different way than if it moved via motor truck direct from the shipper to the receiver. It is necessary to go to considerable additional expense for boxing or crating, or to protect by other means, in order to prevent loss or damage in transit. This additional packing expense is necessary on account of the number of handlings the less than carload shipments receive at the hands of the teamsters and carriers after the material leaves the shipping department.

We have included in the freight cost the first class rate plus 30 cents per hundred pounds teaming charges at shipping and receiving point. To these costs must be added 17 per centum for the cost of carrying the increased weight caused by heavy boxing, and 24 cents per hundred pounds for the increased cost of boxing. The rate via motor truck covers delivery from the shipper's warehouse to the receiver's warehouse. I have averaged this rate, and believe it to be a fair one to use in comparison with the freight cost movement.

The rates that I worked out are based on Newark. I understand that in the freight cost item are included the various items that I have referred to, such as additional crating, additional labor, and so on. I find on shipments moving from Newark to Yonkers that if we combined all the costs, that is, additional costs, to make a less than carload shipment, that the rate averages a dollar per hundred. If you take the same movement by motor truck with decreased boxing, decreased weight, and decreased labor, you will find that the rate averages $.20. Between Newwark and Yonkers there is a difference of $.80 per hundred pounds in favor of the motor truck.

The following table gives cost differences for varying distances

	Road Miles.	Freight Cost Per 100 Lbs.	Motor Truck Cost Per 100 Lbs.
N. Y. City.	12	$0.88	$0.15
Passaic, N. J.	6	.88	.15
Paterson, N. J.....	10	.58	.18
Trenton, N. J.	51	.88	.55
Philadelphia, Pa.	88	.98	.75
Bridgeport, Conn. ...	70	1.12	.75
New Haven, Conn.	87	1.12	.85
Providence, R. I.....	214	1.21	1.15
Port Jefferson, N.Y.	71	.98	.75
Asbury Park, N. J.....	46	.91	.45

I have quite a number of other figures, but those explain themselves, and they average about the same all the way through.

One of the greatest savings made possible by motor truck transportation is that of lumber and other material used for packing, together with additional labor and other charges incidental thereto. The amount of this saving, however, will be controlled largely by the material to be boxed or packed, and how much less protection can be used when moving via motor truck as against a less than carload movement via freight.

While some will save more and others less, depending upon product to be shipped and conditions, the great possibilities of saving warrant careful study of the problem.

Have you taken into consideration the amount of material you have in transit which is not producing any revenue either to the shipper or receiver, while it is in the hands of the carrier?

Have you considered the amount of space you use in your shipping department in order to prepare your shipments to move via freight?

Have you considered how much less space you need in your shipping department if you can materially reduce the amount of boxing and packing used on your shipments?

Have you considered the amount of lumber it is necessary for you to carry for boxing, the space necessary to store it, and the amount of freight charges you pay on wet lumber, if it is stocked in the open as is usually the case? Boxing lumber will frequently carry from 10 per centum to 25 per centum of its weight in moisture,

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unless it is passed through a dry kiln before being used for boxing purposes.

Could you not use any space which can be saved by changing your shipping methods for manufacturing purposes?

Have you considered the amount of material and money your company has tied up, by reason of the fact that you are unable to state definitely how long it will take to deliver by freight between your factories and your customers?

If a freight movement takes thirty days as against one day via motor truck would it not be to the advantage of your company to use the difference in time, twenty-nine days, for manufacturing?

Have you considered the amount of expense to manufacturers and others for storing and handling their products on account of uncertainty of freight delivery?

Any comparison between rail carrier movement and motor truck movement is entirely in favor of the motor truck, as it is necessary for the motor truck operators to make delivery in the shortest possible time, in order to operate their equipment financially successfully. What is needed at the present time is organization on the part of the motor truck operators, in order to secure heavier loading and eliminate as far as possible motor trucks returning without a full load.

In general, I am of the opinion that motor truck transportation can, and should compete successfully with the carriers to short-haul points. The delivery time is all in favor of the motor truck, and I am satisfied if the manufacturers will take into account all the various costs and charges which are part of a true freight transportation cost, that motor trucks can be operated successfully in competition with the carriers for distances of between 10 and 125 miles.

New F. W. D. Fire Fighter

Announcement is made of the development of a new 3-ton fire truck by the Four Wheel Drive Auto Company, Clintonville, Wisconsin, makers of FWD motor trucks. The new fire-fighting apparatus contains an unusually powerful special type J Wisconsin engine, with a five and one-tenth inch bore and a five and one-half inch stroke, developing 42 h.p. S. A. E. The type B rotary pump, driven through a 2-speed transmission, has a capacity of 500 gallons at 120 pounds pressure.

Complete modern fire-fighting equipment is mounted on the body, which is 9 feet long, 4 feet wide and 22 inches deep. A speed of 25 miles per hour can be attained.

Carson With White Hickory

Edward Fraser Carson, for the last two years sales and advertising manager of the Acheson Graphite Company, Niagara Falls, has resigned to take up the same work for the White Hickory Motor Corporation, of Atlanta, Georgia. Previous to his work with the Acheson Graphite Company, Mr. Carson was advertising manager for the Pyrene Manufacturing Company.

Motor Truck Triples One-Man Business in Iowa

DOES AWAY WITH SIX HEAD OF HORSES

"The best buy I ever made," says H. C. Geske of his motor truck. Mr. Geske is proprietor of a one-man soda water factory at McGregor, Iowa. His father before him was in the same business in the same town. In fact, the Geske's, son and father, have been making soft drinks and supplying a considerable territory around McGregor with soda water for a half century.

At the time F. Geske, the father, founded the business, northeastern Iowa was frontier, railroads were few and the Upper Mississippi on the banks of which McGregor is pocketed among the hills was the great commercial highway. Everybody inland for many miles hauled their produce to McGregor and the town became not only the shipping point but the distributing point for a broad territory. Those were the days of small manufactories of all kinds. It was such a small manufactory of pop, ginger ale, etc., that Mr. Geske started in the basement of his home under the name, the "McGregor Bottling Works." He put a "pop wagon" on the road and sold to nearby towns and villages. His son grew up in the business with him and it became in time F. Geske & Son. On the death of the father the son continued the business. Though never attempting to expand it into a large concern, trade over a territory of some 30 miles around McGregor has stayed quite generally with the Geske's, and, as the country grew, six horses and two wagons were used. Even with the growth of railways the little business has preferred to do its own carrying to towns and villages. But this meant extra help to do the driving, for the wagons hauling to towns 20 miles distant must be on the road all day. The high cost of horse feed and man labor made the handling of the business in the time-honored way more and more expensive.

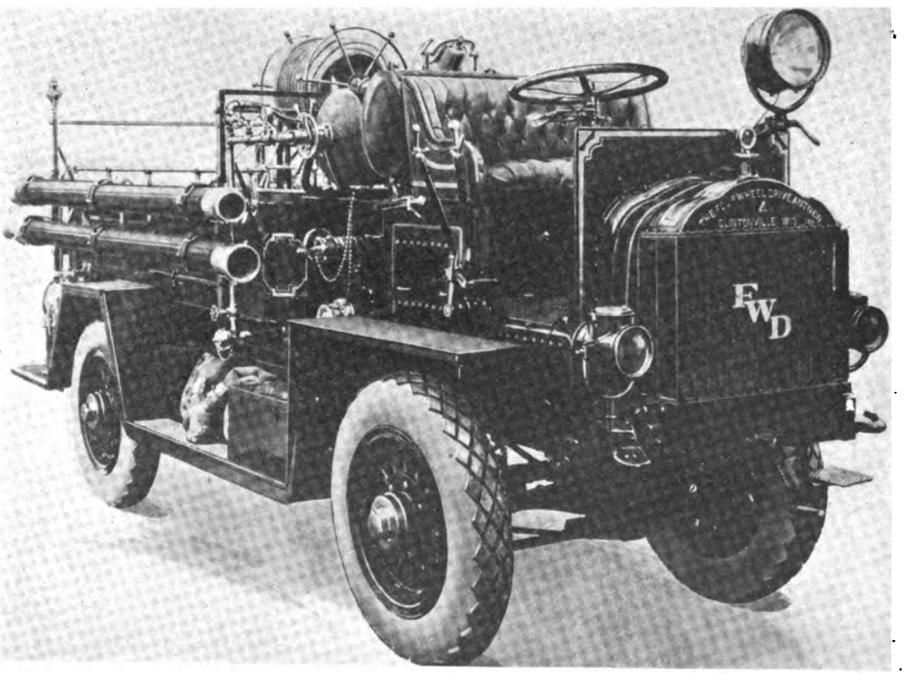
Then it was that the motor truck was bought, the horses sold, the barn closed up, and help discharged, truly quite a venture for so conservative a business. It is now strictly a one-man concern, if we except the very efficient help of the good wife. Mr. Geske drives the motor truck and operates the factory himself. "I am making enough more soda water to supply two-thirds more territory," Mr. Geske says. "With a team I used to need a whole day to make one of my routes. The other day I made Clayton and Garnavillo before breakfast; came home and had breakfast; went to St. Olaf and Farmersburg; came home and had dinner. Then went to Luana and Postville, and was home at 4:30 p. m., and had two hours' work in the factory."

The motor truck not only has allowed him to cover more territory but it has actually, according to his own statement, allowed him the necessary extra time to manufacture the goods to supply the territory. As most of the business is in summer when roads are good the motor truck is practicable even with the dirt roads of Iowa. He used his motor truck, except when snows were unusually deep, all winter this last season.

Mustard Fills Highways

New highways in the Lompoc Valley, California, are to be "all to the mustard."

Fact fiends have figured out that 95 per centum of all the mustard in the world is grown in the Southern California sector known as the "Lompoc," and when the Automobile Club of Southern California recently put over its road bond campaign drive in that region it provided highways which will haul this mustard to market.



New fire-fighter on F. W. D. chassis.

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Railways Great Potential Users of Motor Trucks

WILL USE MACHINES IN SELF DEFENSE

That the railroads of the country will eventually furnish one of the greatest markets for motor trucks is the prediction of C. B. Stanley, manager of the Research Bureau of The Four Wheel Drive Auto Company, Clintonville, Wisconsin. This opinion is based on the fact that the motor truck established itself as an economical transportation auxiliary to the railroads during the pressure of war time haulage and that with the return of the roads to private ownership, and the restoration of the old time competitive spirit, this economical phase of transportation will be keenly developed by the railroads.

"The return of the railroads to private ownership means that each road will avail itself of every possible means of increasing its transportation efficiency," says Mr. Stanley. "During the war the motor truck proved its value in giving relief to the overburdened railroads in a way that demonstrated that it could be used to transport goods speedily, safely and economically. For short hauls, it was apparent that the motor truck was faster, safer and more economical, all of which added to the popularity of the Ship-by-Truck method, and an increased demand for trucking service.

"With the unusual demands over, however, and the return of the railroads to private ownership, it is to be expected that each road will be out getting all the business it can. They will look with jealous eye upon any attempt to divert the traffic of the country to new channels with the consequent result that rather than see competitive trucking service increase and a disposition on the part of motor truck owners to enlarge this service, the railroads will themselves inaugurate fleets of motor trucks to facilitate their transportation.

"The advantages of a motor truck transportation system for short hauls to facilitate the work of the steam roads are numerous. Probably the most striking is their economical feature. There is no expense for the right of way while the cost of upkeep is centered entirely in the motor truck. There is no uncertainty about the terminal charges and no necessity for warehouses. Combined with this, the motor truck has the added advantage of being able to go in any direction without being forced to follow a definite line of rails.

"The concerted action of federal and state commissions to improve the nation's roads and highways is an added inducement that promises to increasingly popularize the Ship-by-Truck method of transportation."

Boyce Moto-Meter Shows Increase

The Moto-Meter Company, Inc., of Long Island City, New York, manufacturers of the Boyce moto-meter, has purchased the factory it now occupies in Long Island City, and is making arrangements for added equipment in order to meet the demand for this accessory. It is interesting to know the sale of this device has jumped 300 per centum during the past twelve months, and the company finds it necessary to expand in order to take care of this increase. While only forty manufacturers used this motor heat indicator two years ago, to-day one hundred and sixty manufacturers have made it regular equipment on their machines.

Firestone Plant at Singapore

By the erection of a million dollar plant at Singapore, Straits Settlements—which is the center of the crude rubber market of the world—the Firestone Tire & Rubber Company expects to cut costs of handling crude rubber hundreds of thousands of dollars annually. The new plant, now in the course of construction will introduce into the Far East some of America's most modern machinery. This equipment will replace the labor of numerous coolies and much work on the part of the East's other famour burden bearer, the caribou. There will remain, however, the need of the productive efforts of 100,000 persons in meeting the company's crude rubber requirements.

Rural Motor Express Is Supported by Maryland

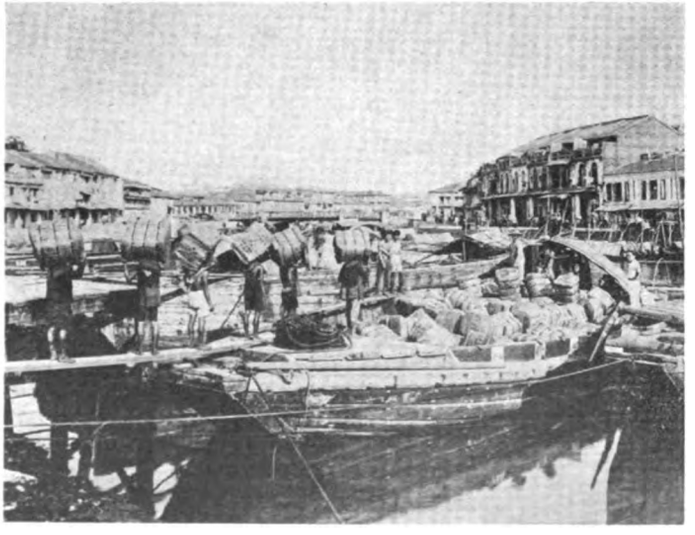
STATE LEADER IN MOTOR HAULING

To maintain and operate in the discretion of the director of farm products, motor lines along the state highways to and from markets, and to maintain a service to and from terminals, docks and depots for the collection of farm products and produce and to establish a system of charges or rates or tariffs for the collection and hauling thereof in addition to the commission for the sale of such goods, is one of the duties devolving upon the proposed director of farm products of Maryland.

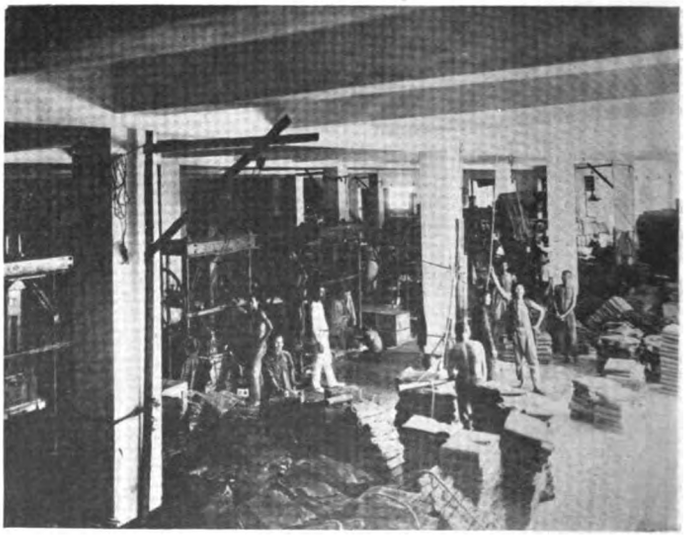
In February there was introduced in the senate of the state of Maryland a bill to promote proper, efficient and economical handling, transporting, distribution and sale of agricultural products of the state and to provide for the appointment of a director of farm products. This bill was favorably received.

Maryland, if not the leader, ranks high in the rural motor express movement. In 1917, the year rural motor express first came into prominence, there were 23 such lines operating within the state. These lines employed 32 motor trucks which traveled 1638 miles daily and hauled over 50,000 tons of farm products in a year. Maryland also, is the home of coöperative transport organizations. The famous Farmers Coöperative Company of Hartford County is, as far as is known the first coöperative transport company to have been founded in this country. It has been the model for the many existing organizations of like character.

Public officials have not been slow to recognize the economic value and necessity of the rural motor express. The recently formed National Association of State Marketing Officials has adopted as a part of its work the investigation and promotion of the rural express. Twenty states are represented in this association. New York state, through its Division of Foods and



Natives carrying rubber bales weighing 250 pounds.



Packing rubber for shipment—Singapore.

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Markets of the Department of Farms and Markets, is now conducting a survey to determine where rural motor express lines are necessary. Governor Alfred E. Smith, upon recommendation of his reconstruction commission, has appointed a highway transport committee to organize rural motor routes. Many other states, through their governors or other officials, have sought to promote the movement by declaring ship-by-truck days on holidays or during state and county fairs.

Motorized highway transportation is growing with astonishing rapidity. New York state alone has over 400 motor express lines in operation. It is estimated that, for the whole country, there are not less than 5,000 such lines in operation. These lines are of greatly varying size and widely scattered. The American Motor Freight Company with headquarters at Sioux Falls, South Dakota, is incorporated at $500,000. A map of its route includes 80 towns in Minnesota, Iowa and South Dakota. The New England Transportation Company which operates out of Boston, Massachusetts, is reported as having 150 motor trucks in service which operate over 12 routes totaling over 1,000 miles in length. The Patriot Motor Express Company, of Wichita and Kansas City, Kansas, is capitalized at $1,000,000. It is reported that the company is operating throughout Kansas, Nebraska and Missouri and will use 250 motor trucks.

Short-Haul Railway Installs Truck With Trailers to Handle Traffic

The increasing interest of railroads in the use of motor trucks to facilitate freight and passenger transportation on short hauls is evidenced in the recent addition of motor lines by several roads. Prominent among these is the Palatine, Lake Zurich & Wauconda Railroad which is using a 3-ton FWD motor truck, equipped with flanged wheels, and passenger body on its 16-mile track from Wauconda to Palatine, Illinois. The motor truck which has a capacity to care for 20 passengers also hauls a trailer loaded with freight and baggage weighing 5 tons. When not pulling a trailer the round trip of 32 miles is made on 6 gallons of gasolene. At one point on its route the machine climbs a 7 per centum grade with full load. It is operated continuously from morning until night.

In a recent letter Thos. J. Lee, vice-president and general manager of the Palatine, Lake Zurich & Wauconda Railroad, said, "I think there is a great field for a motor truck which will operate successfully on a railroad as there are about 250 short lines in this country, which would be in need of them if the right car is built."

According to a report from Popular Bluff, Missouri, the Butler County Railroad has also opened up a motor line from Fargus, Missouri, to Tipperary, Arkansas.

Whether or not the railroads, with their return to private ownership will universally adopt the motor truck as an aid to their freight and passenger hauls is a question that is at present uppermost in the minds of motor truck manufacturers. It is the opinion of some that with a resumption of the old time competition the railroads will add motor trucks to their transportation system in an effort to get all possible business, rather than see it go into outside hands.

Data Essential to Success of Motor Express

Failure of Companies Indicates Lack of Careful Surveys and Accurate Cost Accounting

THAT they neglected to make a careful preliminary survey before selecting a route, or that they did not properly appreciate the value of keeping accurate cost accounts, are reasons those most concerned frequently give for failure in the rural motor express or intercity hauling business, according to E. Farr, director of the Firestone Ship by Truck Bureau. The results of recent investigations made by the Firestone bureau along these lines and some recommendations for the guidance of prospective operators are enumerated by Mr. Farr.

"Investigations conducted by our field men disclose that in a number of cases rural and intercity express lines change hands frequently, and that in some other cases the business has been abandoned altogether.

"Their reports make it clear that frequent changes of management and the failures are due in part to lack of proper consideration of certain factors basic in any business, but more frequently to disregard of several factors peculiar to the operation of a motor express line.

"They convince us that first of all care must be exercised in the selection of a route. Before selection is made there should be a thorough survey of the business possibilities of several routes, This preliminary survey should embrace the following important points:

1. The exact length of the route and the time it will take the motor truck to make the round trip over it.

2. Character and condition of the roads.

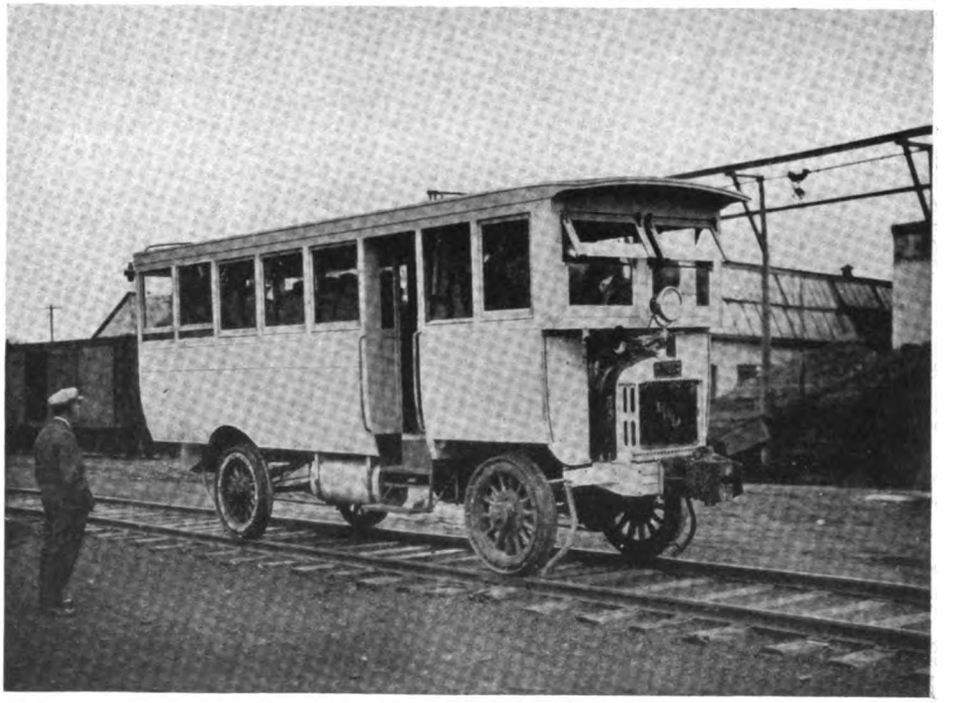
3. Approximate tonnage it will furnish motor trucks moving in both directions.

4. Existing and possible competition.

5. The extent to which motor transportation is regulated by government agencies, such as public service and railroad commissions.

"In making this survey valuable information can be secured from county farm agents, farmers who are large shippers, agricultural and coöperative association leaders, shippers of agricultural implements, local bankers, wholesalers, retailers, manufacturers and commercial associations.

"Once embarked in business, too much stress can not be placed on the keeping of complete cost accounts. The number of operators who fail to take into account such items as depreciation, interest, supervision, insurance and taxes, is entirely too great. Many such men are making their rates so low that operating their business is merely a process of eating up their capital. The impractical methods they are employing not only spell their own failure but also threaten the business of practical operators who find it difficult to compete with them."



Motor 'bus used on short line railway.

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Bakers Employ Electric Trucks for Cleanliness

TWENTY-FIVE COMPANIES USE 1200 TRUCKS

"One can not imagine a more suitable field for the all-electric vehicle than when engaged in city and suburban delivery of food supplies," says an English motor truck journal. "For such work cleanliness is a *sine qua non*, and when this is combined with simplicity in control, reliability, and low running costs, good progress is made towards obtaining an ideal delivery system for food.

"In particular the all-electric should appeal to those engaged in the bakery trade, and such is evidently the case in the United States, where electrics are used much more extensively than in England, judging by information we have received from A. Jackson Marshall, secretary, Electric Vehicle Section of the National Electric Light Association (New York).

"An electric delivery van is also an excellent advertisement for a baker, because bread being delivered by that means one naturally assumes that the bakery itself is run on the same up-to-date and hygienic lines.

"It has been stated that few people see how bread is made, but many see how bread is delivered. Clean bread demands clean delivery, and this means some form of motor delivery. Horse delivery can be dismissed instantly, not only because of its costliness, but more particularly on account of its obnoxious uncleanliness. The two remaining forms of delivery available are the gasolene wagon and the electric vehicle, each of which possesses certain inherent qualifications that warrant its use in the fields where it can render the best service.

"The chief advantages of the gasolene car are speed and unlimited mileage, which admirably suit it for long-distance operations. The electric vehicle is ideal where frequent stop deliveries are necessary, and where the range of operations are within the capacity of a storage battery, which is up to forty, fifty, or more miles per day, which has proved to be more than ample for urban operations.

"The electric vehicle is, we are told, the favorite mode of transportation by bakeries in the United States, and, in confirmation of this Mr. Marshall gives a list of twenty-five baking companies who among them employ a total of 1,200 all-electrics. These fleets, which are constantly being increased, represent unmistakable evidence of the advantages of electric transportation in the baking industry.

"One of the most recent series of electric vehicle installations by a bakery company is that of the Cushmans' Sons, Inc., which operates plants and stores in Greater New York. This company purchased in March, 1919, fourteen 1-ton electric vehicles; in April, two 6-ton; in May, thirty 1,000-pound; and in December, ten 1,000-pound electric trucks; or a total of fifty-six electric vehicles during the year."

Mercy on Her Missions Uses Extremes in Vehicles in South Europe

Just an ambulance on its way to succor the sick, to rush some serious case to the hospital in time for the operation which may save a life, mayhap to the scene of some accident where immediate aid will prevent amputation or loss of sight. An ambulance with padded sides and ball-bearing stretcher, which rolls easily in and out on rubber-tired wheels, as painproof an apparatus as is possible for mortal hands to fashion.

From this ambulance of the city the imagination turns to the native ambulances in the Balkan states. In Serbia or Roumania the patient is usually brought to the American Red Cross hospitals in an ox-cert ambulance, the only padding a pile of straw, the only covering a bit of hay.

While in the mountainous countries of Montenegro and Albania it is not always possible to use even the ox-cart in transporting the sick. The ambulance of the hillmen is not exactly comfortable or rapid—but it is safe. For it is the sure-footed mountain burro, and rough as it is, riding astride a donkey is the smoothest and easiest method of traveling over the rocky trails of the mountain country. The American doctors and nurses in Albania or Montenegro are never surprised to receive a patient who has traveled many, many miles donkey-back to reach the Red Cross hospitals.

Road Building Waits on Freight Cars and Labor

SEVERE WINTER ALSO HALTS CONSTRUCTION

WASHINGTON, D. C., March 22.—That 1920 is liable to prove an "off year" in permanent highway construction is the unanimous opinion of specialists who have recently looked into the situation very carefully. Car and labor shortage is the cause ascribed by the authorities who have been reluctantly forced to the conviction that the nation is destined to mark time on its ambitious road program until 1920 has passed. Investigation has shown that the shortage of cars suited to the transportation of road material is a fact and not a theory and that the railroads will not be able to build enough cars this year to afford relief. A country-wide survey of the labor situation shows as far under par the available resources of labor of the class needed for road construction. Finally, and to make matters worse, the past winter has been, in most sections of the country, an unusually severe one and an unusual amount of restoration and repair work will be necessary on the existing highways, thus reducing by just that amount the labor, machinery and material that can be devoted to new construction.

The situations existing, respectively in Wisconsin and in Illinois are cited as representative of two types of predicament that affect the highway improvement outlook. In Wisconsin the state has had to cut in half its program which called for the construction of 500 miles of road in 1920. In Illinois the state fell so far behind schedule in its road building in 1919 that the uncompleted work is thrown over into 1920 with the result that what would otherwise have been the 1920 campaign is held in abeyance. Expert opinion is that, thanks to the distribution of surplus war stock, there is available ample road building equipment. It is the shortage of material and labor that is playing havoc.

Between January 1, 1919, and January 1, 1920, a total of $79,983,000 bonds for building highways was voted for by counties in the state of Texas.

Ambulance headquarters at Visntza, Albania.

Crude ambulance used by Serbians.

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Road and Street Development

Highway Improvement Throughout the United States Has Taken On New Life Until It Has Reached the Proportions of a National Movement

TWO important road contracts in Virginia were awarded February 3. Nansemond County placed a contract for about four miles of concrete road with Rogers and Royer, Inc., Roanoke, Va., at $3.05 per square yard; and Princess Anne County awarded a contract for over ten miles of concrete road to R. P. Denby, Norfolk, Va., at $3.10 per square yard. Standard specifications will be used in both jobs.

AN eight mile contract for concrete road in Whatcom County, Wash., was awarded at Bellingham on February 11, to the Skagit Construction Co., of Mount Vernon. The price will be $2.23 for one-course concrete, 1:2:3 mixture, 6-8 inches thick. Whatcom County is the extreme northwest corner of the United States, and is a leader in the construction of fine concrete roads.

AT Albuquerque, N. Mex., a contract for 9.6 miles of concrete highway was awarded February 9 to the Lee Moor Construction Co., of El Paso, Tex. The pavement is to be 16 feet wide, 5-7 inches thick. The contract price was $1.40 per square yard exclusive of cement which is to be supplied by the state.

CONTRACTS for a number of short sections of concrete paved streets, in Kansas City, Mo., were awarded February 10. The work aggregates 22,000 square yards, divided into eight contracts, among five contractors. Prices secured range from $3.10 to $3.69 per square yard; the pavements to be 6-9½ inches thick, 1:2:3½ mixture, plain concrete.

THE Colorado State Highway Commission recently awarded four contracts for comparatively short sections of concrete paved highway, totaling 68,034 square yards, in Mesa, Boulder, and Larimer Counties. Contract prices range from $1.85 to $2.09 per square yard, not including cement, which is to be furnished by the State Highway Commission.

A STATE highway contract in Juneau County, Wis., has been awarded to Fred Bossart, Contractor, of Grand Rapids, Wis. This improvement will connect the business section of the town of New Lisbon with the C. M. & St. P. Ry. depot, and will require 20,632 square yards. All materials are to be furnished by the state, f. o. b. cars at one end of the job. Mr. Bossart will haul the materials and lay the pavement at a contract price of $1.15 per square yard.

ONE of the important road projects in Michigan is the Detroit-Chicago Highway across the southern part of the state. A contract for 9.5 mile section of concrete pavement on this highway in Branch County, was awarded about February 14 to the Kalamazoo Paving Co., of Kalamazoo, Mich. The pavement will be 16 feet wide, 6-8 inches thick, not reinforced, and the contract price is $2.90 per square yard.

TWO concrete road jobs were awarded during February in Clearfield County, Pa., by the State Highway Department. These improvements will include about 1.5 miles on State Route No. 50-2, and about 2.5 miles on State Route No. 60-1. These were awarded, respectively, to Johnson and Kearns, of Du Bois, Pa., at $3.75 per square yard; and the Burnside Construction Co., of Clearfield, Pa., at $3.85 per square yard. The pavements will be 18 feet wide, 6-8 inches thick, reinforced.

THE State Highway Department of Illinois has awarded contracts for approximately thirty-nine miles of permanent roads at a total estimated cost of $1,252,187. These are the first awarded this year. One stretch of nearly twenty-nine miles will connect the Dixie Highway at a point near Danville in Vermillion County with the old National Trail at Marshall. More than nineteen miles of this is concrete at an average cost of a trifle more than $37,000 a mile. Five more miles of brick average $44,740 and more than four miles more include a long bridge. The average for the complete stretch is a little more than $41,000 a mile.

The other award is a section of the Chicago-Springfield road between Chillicothe and Henry. This nine and one-half miles will average $33,897 per mile.

PLANS for the expenditure of $800,000 a month, a total of $10,000,000 for the year, have been completed by the California State Highway Commission, according to advices from Highway Engineer Austin B. Fletcher.

UNDER the leadership of the Chamber of Commerce of Portland, Ore., civic organizations in that State, and other Coast and Rocky Mountain states, are launching a campaign to obtain a Government appropriation of $100,000,000 for highways through forest reserves.

MANITOWOC, Wis., will build this year 80,000 square yards of concrete street pavements. The work will be done by the Manitowoc Construction Co., local paving contractors, at $2.74 per square yard.

WABASH County, Ind., has just awarded a contract to J. C. O'Conner & Sons, of Ft. Wayne, for 10.5 miles of concrete to be built on the Vernon Pike, for a total price of $426,427.

BEFORE the war prices no longer prevail in Florida and the people of that state will have to raise two or three times as much money to pay the cost of pavement as they raised two or three years ago. Bids submitted to the department ranged from $35,000 to $42,000, the bids being submitted on 54 miles of state roads between Jacksonville and Lake City and all bids, with one exception, were rejected. The one bid not rejected was taken under advisement.

GRAVEL will be generally used on the roads of Michigan, according to John W. Schneider, of Albion, president of the Michigan Roads Commissioners. This is due to the uncertainty of railroad facilities in furnishing aggregate and the certainty of not getting enough cement to lay concrete roads to the desired extent.

THE government is now building a splendid road from Thompsons Springs, Utah, to Moab, Utah, the location of the recent oil strike. The road is to cost $200,000 for the 37 miles when completed and will be 24 feet wide on the flats, 18 feet on the hillsides and 16 feet in deep cuts. It is being pushed rapidly.

THE South Carolina Good Roads Institute was organized by men in that state interested in road building, as a result of the road school held under the auspices of the three state colleges and the South Carolina State Highway Department on March 3 and 4.

THE old Quinton and Marlboro Turnpike, on the route between Salem and Bridgeton, New Jersey, was officially taken over by the Salem County Board of Freeholders and freed of tolls.

This is one of the last of the old toll roads in South Jersey, nearly all of the others having been abolished in recent years, one of them being the much-traveled turnpike between Millville and Bridgeton, now a part of the new state highway system.

ACCORDING to answers to a questionnaire sent out by the Montana Highway Commission, there is a wide difference in wages paid in various sections of the state. At the time this information was compiled, in 32 out of 50 counties traction engineers received from $5.50 to $8 per day of eight hours; truck drivers from $3 in Carter County, to as high as $8; concrete workers from $4 to $7, and common laborers showed variations from $3

Kiken Promoted by Buda

R. A. Kiken has been appointed to the new office of service manager of the engine division of the Buda Company. Mr. Kiken's experience in the engine business dates back to February, 1910, when he first entered the employ of the Buda Company, since which time he has served in virtually every branch of the factory, including stores, cost, production efficiency and sales work.

The longest way round is the shortest way home when the first is an improved hard-surfaced road and the other mud.

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Legislation and Legal Decisions

Comments on Current Legislation Affecting Sale and Operation of Machines Together with Answers to Questions Will Be Found in This Department Each Month

By A. KALISKY
Attorney-at-Law, New York City

A NEW bill to license automobile operators throughout the state of New York is before the legislature at Albany. It is radically changed from the former bill along similar lines, which aroused so much opposition. This new measure provides for a nominal fee of 50 cents, the license to be good until revoked—that is, it will not have to be renewed with another fee at the end of the year. The fee is quite sufficient, and the provisions are liberal enough to satisfy the farmer element, and doubtless every one else except the dwindling number of those who continue to believe that every phase of motor legislation is an outrage.

The latter view, it is true, has been encouraged in too many cases by the narrow policy of legislators in singling out motorists as a class of persons who ought to be made to pay for their pleasure, and pay well. Unfortunately, the attitude of revenue from motorists is still in evidence in many parts of the country, but the growing recognition of the utility of the motor vehicle, not only in respect to the passenger car, but especially in the value of motor truck service, has led to a wiser legislative view of the matter in many states. No additional taxes are to be required from commercial car owners this year in New York, despite the rumors that higher fees for trucks were seriously considered some time ago. Compared with other states, the commercial motor registration in New York is reasonable. New Jersey has just added a 20 per centum increase, due chiefly to the legislative view that additional sums must be obtained from motorists for road maintenance. Next year New York motor truck owners may be called upon to pay more, but the merits or demerits of that question can be left until the problem is concretely presented.

IN the licensing of operators there is surely no reason for exactng a heavy tribute. New York did show a tendency last year to take the revenue getting side of the matter in the effort to oblige operators in New York City to pay $2 for the renewal of licenses, instead of $1. A bill authorizing the higher fee was presented by the legislature early in the session, but present indications are that the $1 renewal for city motorists will not be changed. That fee is sufficient and it still leaves metropolitan motorists in the unenviable position of being discriminated against at the expense of the rest of the state, for if the state-wide operators' license bill becomes a law, drivers of cars outside of New York City will have the advantage of a 50-cent fee good until revoked, subject to an examination of fitness, if deemed necessary. The new law, if passed, will take effect on September 1. Among its stipulations are that no license shall be granted to a person under 18 years of age or more than 70 years unless the Secretary of State is satisfied that the applicant is competent to operate a motor vehicle.

It would almost seem that those responsible for the new state-wide operators' license act had taken their cue from the bill which went into effect in Michigan August last, for its revenue provisions are the same as the Michigan law, the fee in that state being 50 cents, good indefinitely or until revoked for cause. The interesting feature about the Michigan act which, in itself, presents a striking object lesson of the realization of the fact that an operator's license act is the best method thus far provided to act as a check upon reckless drivers, is that it was directly sponsored by the Detroit Automobile Club. It was drawn up through the instrumentality of William G. Bryant, the club's attorney and chairman of its legal committee and also the traffic attorney for the Detroit police department.

IN explaning the reasons for the advocacy of the Michigan bill, Mr. Bryant. in replying to a recent request regarding its benefits, said:

"This was one of the pet measures of the Detroit Automobile Club for the suppression of the reckless driver and the automobile thief and to vercome a very decided tendency in our Detroit courts to release, acquit or let go on suspended sentence every man who had been complained against for driving while drunk, causing injury to property and to persons, appropriating the car of another and driving it recklessly on the streets. The result, before the passage of this act, was that a certain class of careless and reckless drivers, as soon as released by the court, would go out and do it over again, with the result that certain taxicab drivers and others in the city of Detroit have records of from fifteen to twenty complaints against them, with practically no convictions.

"With this law on the books the Police Department was able to go out, grab these fellows, report them to the Secretary of State and have their licenses to drive revoked from periods of anywhere from thirty days to the entire year. Several hundreds of licenses have been revoked under the law; many taxicab drivers and other negligent drivers in Detroit were forbidden to drive, the revocation of their licenses automatically making it a misdemeanor to drive an automobile, the law requiring each driver to carry a license. It was also an object lesson to other drivers. It had a very strong tendency to make them more careful in the operation of automobiles on the streets of Detroit and highways of Michigan."

Another significant feature is that this bill was strongly supported by a club of practically 9,000 members in the largest automobile manufacturing center in the country. Primarily it was a safety first measure and Mr. Bryant says that he believes the law has saved a great many lives in Detroit since it went into effect, by removing from the streets drunken, reckless and criminal drivers and by keeping them in check.

"The expense is practically nothing," he adds: "it is no hardship to the automobile owner or driver, even if he has to obtain four or five licenses for one family, and as far as I can ascertain there is no criticism of the law in Michigan at the present time."

Mr. Bryant is also a member of the legislative committee of the American Automobile Association, and in view of what has been acomplished in Michigan he says that he is preparing to advocate during the coming year the passage of similar laws in every state in the Union with other legislation tending to reduce the number of stolen automobiles and thereby saving a good proportion of the money now necessary to pay out for high insurance rates.

UNLIKE some of the other states where operators' licenses are required, the Michigan bill provides for no examination. The sponsors of the bill believed that the benefits supposed to accrue from the examination requirements are fully obtained and more simply in the answers to the eleven questions on the application blank. The applicant is required to state whether he has ever been convicted for violation of any motor vehicle law or ordinance, the miles he has driven a motor vehicle, and whether there is any physical defect which might militate against motor vehicle operation.

In Connecticut operators' licenses are renewed without examination, providing the applicant has had a license in the preceding year, and providing his license has not been revoked for cause.

Commissioner Robbins B. Stoeckel, of Connecticut, takes issue with certain opponents of any operators' license requirement in their argument that it has no standing as a safety-first measure. In 1916 motor fatalities in the state average 31 persons per 10,000 of registrations, the highest point ever reached there. The new law went into effect in 1918 and last year the average of deaths from motor accidents represent but 21 for 10,000 registrations.

"The reason," adds Commissioner Stoeckel, "is very obviously the good law, and the fact that this department has control of the policy of enforcement and is

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able to secure uniformity throughout the state. When the operators' license law was put into effect in Connecticut the mortality rate decreased immediately, showing the obvious effects of the law."

In the District of Columbia a movement has been started to require an examination from all motor car operators. While the applicant is required to make an affidavit that he is familiar with traffic regulations there, it is only necessary for him to swear that:

"I have had at least two weeks' experience in operating a vehicle of the class for which the permit is desired."

It is unnecessary to state that advocates of a different system feel that some visible evidence should be given, especially by a new driver, regarding the amount of motor experience required within two weeks.

Toner Resigns from Maxwell

The resignation of T. J. Toner as director of Maxwell and Chalmers sales is one of the most surprising announcements made in automotive circles this season. The news was released by Mr. Toner following his return from an extended trip to the west coast, effective April 1, and was totally unexpected by his closest associates.

Mr. Toner was first induced to join the Maxwell forces by Walter E. Flanders in 1910. It is held that Toner has developed one of the largest personal followings among dealers at large of any man in the industry. Although generally considered a Maxwell official, he receives a large portion of credit for the popular comeback of the Chalmers, since 1917, at which time he became sales director of the combined lines. In the same year the first Maxwell motor truck was put on the market and to-day it is claimed there are 20,000 in use, sold under Toner's supervision.

Horses Lose Each Time

Farmers when discussing the motorization of the farm are always ready to state that even though most of the work of the farm will be done in the future by motor-driven devices, the horses would still be found necessary. H. F. Harris, president of the Bethlehem Motors Corporation, calls attention to the fact that street car railroads were electricized, and for a long time maintained large stables of horses. Electric roads have no horses to-day. Big business in the large cities motorized, and for long periods continued to maintain stables of horses because of some lack of confidence in the motor equipment. Big business gave up their horses. Farmers will motorize and continue to keep their horses until such time as their confidence is thoroughly established in the motor equipment of the farm motor truck, tractor, etc., when they will quickly give up the horses.

If there was ever a time in the history of this country when the building of roads on which heavier loads may be hauled in longer stretches at greater speed with reduced power-cost, that time is now.

Canny Scots Look to U. S. For 1920 Motor Trucks

EDINBURG DISTRICT RIPE FOR MARKET

Long before the war there was a well defined and growing tendency in Edinburgh, Scotland, in favor of motor transport. That tendency was greatly accelerated by the experiences of the war. Questions which used to be academic are very real and urgent to-day, and transport touches the supply and prices of commodities. The old methods of distribution have partially broken down, and problems formerly confined to experts are eagerly discussed by the public.

During the war persons who had horses had to give them up to the military, and so were driven to adopt mechanical traction. These people have no desire to return to horse haulage. Horses, moreover, are still scarce and high priced—a good Clydesdale brings $973. The signing of peace was the signal to business men to launch new enterprises and experiment with all manner of improvements. The result of these and kindred influences is an enormous and much greater demand for motor vehicles than the trade is in a position to supply.

Germany used to send some good machines into this market, but while the bitterness of feeling has abated somewhat, there is no desire to handle German goods. Belgian cars had a fair reputation, but nothing is promised from that source in the near future. Italy and France may soon be in a position to receive orders; it is doubted, however, if they can do much toward relieving the situation in Great Britain. It is plain that dealers are looking only to America to solve the problem of short supplies. They frankly say that British manufacturers can not possibly cope with the demand. These firms, it is pointed out, have to contend not merely with all the disorganization caused by the war, but also with the delaying effects of labor unrest and the consequent difficulty of obtaining materials. While confidence is expressed in the quality of British workmanship, it is conceded that "mass production" gives America a marked advantage in the vital matter of cost. With all the speed they can make, it is commonly asserted by dealers, British makers could not meet the demand within two years.

There are many inquiries for motor omnibuses and touring chars-a-bancs (wagonettes). The Corporation of Edinburgh has experimented with a type of 4-ton chars-a-banc carrying 32 passengers and costing $7,780. These have been used for opening up to sightseers parts of the city and its environments imperfectly served by the corporation tramways. They proved successful beyond expectation, and a dozen additional cars were ordered. It is a common belief that by summer there will be a great demand for such conveyances all over the country. Vehicles of 3 or 4-tons' capacity to seat 30 persons and to cost $7,300 to $7,786 are wanted to link up small outlying villages with neighboring cities or towns. They are also required for touring purposes in the Highlands. A recent development is also attracting attention—a new craze of football partisans to make long motor journeys in chars-a-bancs in order to be present at matches in which their particular clubs participate. Hundreds of enthusiasts have been traveling in that manner between Glasgow and Edinburgh and Dundee and Edinburg. This traffic will doubtless increase considerably.

There has also been a brisk demand for light delivery trucks.

The one company which produces heavy motor vehicles in Edinburgh for its own use has a fleet of 50 motor 'busses running daily between Edinburgh and surrounding country towns and villages. On certain routes the company's operations have seriously affected the railways. The omnibus traffic was remarkably profitable during the summer of 1919.

Edinburgh is a particularly good place for motor car distribution, owing to its position relative to such large and important towns as Dundee and Aberdeen, and to the English border sections.

While anxious enough, naturally, that British manufacturers and workmen should benefit by the demand for motor vehicles, dealers are not disposed to labor the point; they are not particular where the machines come from if the right goods come to the market promptly. One large firm freely says that the public is recognizing that American-made machines are more fully equipped than British, and contain many little touches which British makers have apparently not yet thought of. The old notion that the American machine is less solidly built than the British has been dissipated. Quality for quality, American machines can be marketed in Scotland for lower prices than those obtaining for British makes.

On October 1, 1919, there were in the Edinburgh consular district 5,556 private automobiles, 2,864 machines used for trade purposes, 1,219 taxis and private cars used for hire, 1,132 heavy motor cars (of more than 2-tons' weight), and 8,145 motor cycles.

Trained Motor Truck Men

The War Department advises that in the next three months there will be discharged from the Motor Transport Corps approximately 3,000 men. Particulars regarding the experience and qualifications of individual men will be furnished by the office of the Chief of the Motor Transport Corps at Washington. A large percentage of the men have received special instruction at the Motor Transport Training School.

Brockway Motor Truck Co., Cortland, New York, has issued a 32-page catalog, in which the principles of motor truck making are set forth, and the advantages of the Brockway machine are clearly stated.

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Right Driver Keeps Truck Sold

Training Schools for Operators Is Considered Necessary Selling Expense by Many Large Producers of Commercial Motor Vehicles

UNTIL a person begins to gather material on the cost of operating motor trucks, he has little idea how much these costs vary. During a recent survey of one industry using all sorts of motor vehicles it was found that the operating cost of light cars of the same make varied all the way from 5 cents a mile to 14 cents a mile. It was not possible to make as thorough a comparison of heavier motor trucks because there were not as many concerns using the same make and weight of vehicle.

A further investigation into the causes of this difference in cost developed the fact that a great deal of it was due to the care used in selecting drivers and the number of people who were allowed to drive the same machine. Of course, local conditions had something to do with the costs. The condition of the roads, the degree of flatness of the section of the country where the cars were used, and the density of the traffic in the city streets all had something to do with the operating costs but little compared to the way that the machines were driven.

When one begins to interview motor truck owners in regard to operating costs, he does not have to make many calls before realizing the importance of more careful driving. In fact many of the owners will frankly state that they would use more motor trucks if they could secure satisfactory drivers. They are using horses at present, not because they desire to do so or that they think they are cheaper but because poor driving does not appear to drive up the operating cost in the case of a horse to the same extent that it does in the case of motor trucks.

IT is the way the thing is used by the purchaser that often has more to do with future sales than any other one thing. A concern selling household machinery never so much as makes a personal call until the sale of the machinery is made. All the preliminary conversation is carried on over the telephone. After the sale is actually made the concern sends a man to demonstrate the machine and to teach the purchaser and the person who is to use the machine just how to operate it. If, after a time, another person is to operate the machine this company sends an expert to teach this new person how to operate the machine. In other words this company uses every precaution to have all of the machines it sells operated by people who have been given careful and personal instruction in their operation.

The result of this policy has been that each and every customer is boosting. Every day some user telephones in the name and address of a good prospect. A peculiar thing about some of these new prospects is the fact that many of them already have or have had machines of different makes which should have given perfect satisfaction but the use of which has been discontinued because the owners did not understand just how to operate them.

We find advertising agencies finding advertising managers for their clients, we find manufacturers of various kinds of machinery and engineering products finding the right men to operate or to supervise the operation of the machines that they manufacture. In line after line we find successful concerns using a great deal of care in making certain that their machines are operated in the most efficient manner.

This is an angle of the selling of motor trucks that it will be well to give more and more attention. Both manufacturers and dealers can well afford to give more attention to the training of drivers and to finding suitable drivers for motor truck purchasers.

SIMPLY because a man thinks that he can drive a particular motor truck is no sure sign that he will be able to drive it with the greatest efficiency. Some men will not admit that they are unable to do anything you ask them if they can do. Many of them are not as frank as the man was when asked if he could play a violin replied that he thought he could but he was not sure for he had never tried.

Cutting down the operating costs of motor trucks to the minimum will result in a very material increase in motor truck sales. Operating costs, however, can not be cut down until the man who sells the motor trucks does everything within his power to have the machine that he sells driven in the most satisfactory and efficient manner.

There are but two ways of making sure that this is the case. One is to find a good driver for each motor truck sold. The other is to conduct a school of driving and to teach and develop good drivers. This will prove to be a profitable selling expense in that each driver taught to drive a certain make of motor truck is likely to become a pretty good booster of that machine. In any case he is likely to show a better operating cost for motor trucks of the make he has been taught to drive than of those in whose driving he has not received any special training.

The sale is hardly half made when the motor truck is delivered and the money paid for it by the purchaser. Each motor truck that is sold is really on probation until it makes good. It will not make good to the extent that it should unless it is driven by a good driver. Each driver trained, therefore, becomes a sales clincher and paves the way for sales that would not have been made if not so much care had been taken to make certain that the driver had become really expert. The aim, therefore, should be to teach each driver to become as expert as possible.

Advises Dealers to Talk Closed Cab When Selling Trucks to Farmers

Walter Smith, who has a small farm in Marion County, near Indianapolis, has the following to say to motor truck dealers:

"If you are going to talk motor truck to the farmer, talk closed cab also.

"I remember when I was a youngster of eighteen and had to get up at 2 o'clock in the morning to hook up the team and cart stock to the city, fifteen miles away, with the temperature fifteen below zero. One of those trips cost my father several hundred dollars in doctors' bills, and almost cost me my life. A case of pneumonia, induced by exposure.

"I still haul live stock to the market, but I use a motor truck, and the motor truck has a cab, equipped with doors, so that the seat is as warm as my bed at home. The heat of the engine stays in the cab.

"I know of several arguments in favor of the motor truck, as compared to the horse-drawn vehicle, but the one that appeals to me and every man who has to brave the blasts of winter whether he wants to or not, is the closed cab. The question of economy loses some of its weight when the farmer considers the question of comfort. I am not convinced that a motor truck is cheaper than horses and a wagon, but I know I can take a load to the city without paying in health. And that is why I bought a machine."

Reos Make Long Run

Two Reo speedwagons, each carrying 1 ton of steel frame members, recently made a trip from Milwaukee, Wisconsin, to the Reo plant at Lansing, Michigan, via Chicago, a distance of 350 miles, in the face of a raging snowstorm in the elapsed time of 23 hours. Including stops made by the drivers for rest, meals, etc., an average rate of about 15 miles an hour was maintained.

The start was made at Milwaukee at 6:30 p. m. Chicago, a distance of approximately 100 miles, was reached 6½ hours later. No noteworthy happenings were encountered until about noon on the next day, when the worst blizzard of the season developed, which, while causing little discomfort to the drivers, made the "view ahead" practically indistinguishable. In some spots snowdrifts were encountered, but the two Reos plowed right along without either mishap or delay. Lansing was reached at 5:30 p. m.

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for about two years has been using

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"EVERLASTING"

as Standard Equipment on its 5-Ton Model

The Smith Wheels have kept themselves sold by perfect performance. They have satisfied ACME users so well that ACME is now buying Smith Wheels in substantial numbers for its 3½-Ton Trucks.

With an eye to the future ACME is striving to build up a reputation for Quality. Smith Wheels carry a guarantee which has no limit.

SMITH WHEEL INC.
SYRACUSE, N.Y. U.S.A.

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"Help the Rail Chiefs"

By G. A. KISSEL
President Kissel Motor Car Company

JUST before the railroads were returned to private ownership March 1, the heads of the different railroads through the press, asked the public to help during the period the individual owners of the lines were getting back into harness.

The different statements the railroad presidents issued showed that they realized that it was going to take time before their properties could measure up to the full demands of the country. But as Howard Elliott, president of the Northern Pacific, said, "it will be done more quickly if the public will coöperate and will be patient over inconveniences and delays because of the inability of the railroads to produce at once the quantity and quality of transportation that the public needs."

Likewise, A. D. Loomis, president of the Lehigh Valley, said, "the public must be patient during the test period." T. DeWitt Cuyler, chairman, Association Railway Executives, said, "There will be a tremendous pressure behind service to secure traffic. Greater effort will be made to satisfy shippers and passengers. Supervision will increase in effectiveness."

A. H. Smith, president New York Central lines, said, "The greatest difficulty now is sufficient equipment. Without sufficient equipment the lines can not properly function, and the farmers, merchants, manufacturers and citizens will be seriously effected until this condition is remedied. What is required is equipment and facilities to supply the maximum requirements of the people."

FROM the foregoing it can be seen that the rail chiefs, realizing that the railroad equipment is insufficient to meet the nation's shipping and transportation requirements, are going to do the best they can under the circumstances and ask the public to have patience until they bring their equipment up to that point of efficiency where they can function properly and prove equal to cope with all requirements. This we should all do by every means in our power. Ways and means must be found to make up for this lack of equipment, and it is here that the motor truck will be pressed into service in greater quantities than during the past two or three years.

It is fortunate that the motor truck has outgrown its swadling clothes and has grown into a full-fledged transportation unit, because without its adaptability and economy, the country's shipping schedules would indeed be in a chaotic condition. Without a doubt when the rail chiefs have put into effect the many new plans and ideas they will evolve to "efficiencyize" the railroads, they will probably be the most highly efficient railroads in the world, but between now and that time, the nation's production schedules must be kept up, in fact, they must be increased, which is possible only through having a distributing channel that will not be interrupted or clogged up.

Distribution is a vital necessity to the life of the nation. In every branch of industrial, commercial and governmental activities it is as necessary as an outlet to a river. Without an outlet the inlet soon causes a destructive flood. With a production program turning out millions of tons of goods, if there is no distribution it soon floods warehouses, terminals and freight yards, choking not only industrial growth, but industrial progress.

THE main trouble seems to me that there are not enough freight cars to supply the required number to each industry. For instance, the government requires so many thousand freight cars, industry, such as iron, coal, steel, demands so many thousand freight cars, agricultural America demands so many thousand freight cars to move the nation's crops and foodstuffs, after which comes the different branches of commercial America, the manufacturer, the raw material makers, jobbers, and retailers.

Therefore, if there are not enough cars to meet the demand, the best the railroads can do is to apportion a fair number to each business and then that business has to make up that shortage the best it can.

This was the situation several years ago, and business men in looking around for other transportation units to make up the shortage found only one that could be adapted with any degree of success and efficiency—the motor truck.

Since its adoption by industrial America it has not only proved itself adaptable to the requirements of every line of business in the country, but in addition has proved very economical and efficient.

Meeting emergency demands in such an efficient manner caused American business men to use the motor truck extensively, and as the country gradually expanded and increased its production schedules, the motor truck was required in greater numbers to meet this expansion.

And why not? The motor truck is practically the same as a railroad freight car, ton for ton. Like its railroad brother it is a piece of machinery that needs care and attention, efficient routing and careful driving, with the added advantages of not requiring a definite right-of-way nor leaving goods several miles from the consignee's door.

The motor truck owner and driver who appreciates the present transportation situation and operates his motor trucks efficiently and economically, will not only help the railroads at a time when they need help, but will himself benefit greatly through increased transportation efficiency and lower transportation cost

There is no objection about it, if the motor truck is operated along a well planned and carefull thought-out schedule, the cost of delivering goods by motor truck would be reduced quite considerably over the present cost, which is considered low as compared with other transportation methods. The motor truck is essentially a long distance overland transportation unit, built to haul a given tonnage of goods mile after mile, day in and day out, at a given speed that compares very favorably with the average speed being maintained by other transportation units. It is built to stand up under freight haulage work. Every moving or fixed unit in its chassis or frame, is so designed to do its share in the work of standing up under the load and helping to move it forward. The American motor truck manufacturer leaves nothing to chance—every inch designed by engineers who have studied motor truck transportation requirements and conditions, has received the closest inspection. There is nothing questionable about these motor trucks in so far as their construction and ability are concerned.

THERE remains then the remaining factor in the successful adoption of the motor truck—that of the owner and driver. The owner looks at his motor truck from an investment standpoint—it represents so many miles of transportation, the quantity depending on the care given the machine. He should see to it that when it is placed in commission the party who has charge of that motor truck realizes the dividends he expects from it and should operate it in a way that will insure those dividends being paid.

And likewise, the motor truck driver. There is a proper way of driving a motor truck as well as an improper way; there is a proper way of loading and unloading a motor truck: of taking care of it at the end of its day's work. It is up to the owner to realize this and make sure that his driver follows the proper methods.

Just as the railroads are starting out to build up transportation efficiency, so, too, should the motor trucks in America be put on a highly efficient operative basis. It would not only help the railroads to a greater extent, but it would mean an added increase in saving of time and money and would greatly aid industrial America in meeting and measuring up to its transportation requirements.

Like the balky mule, the Almighty Dollar refuses to move where mud and mire constitute the road from field to farm and from farm to market.

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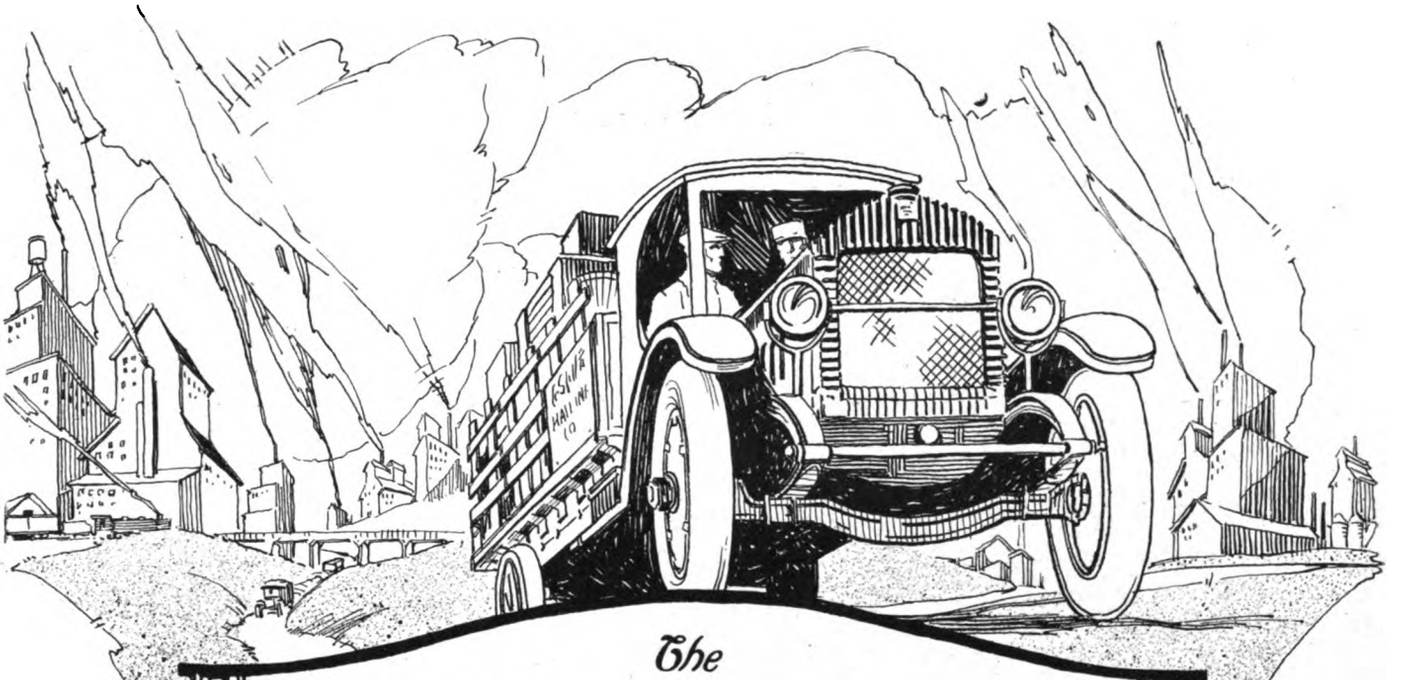


The

Handiwork of Master Artisans

In the ancient guilds the master artisans were guided by the principle of perfection. They labored skillfully and wrought the marvelous lace, silk, gold and marble that has caused the modern world to wonder.

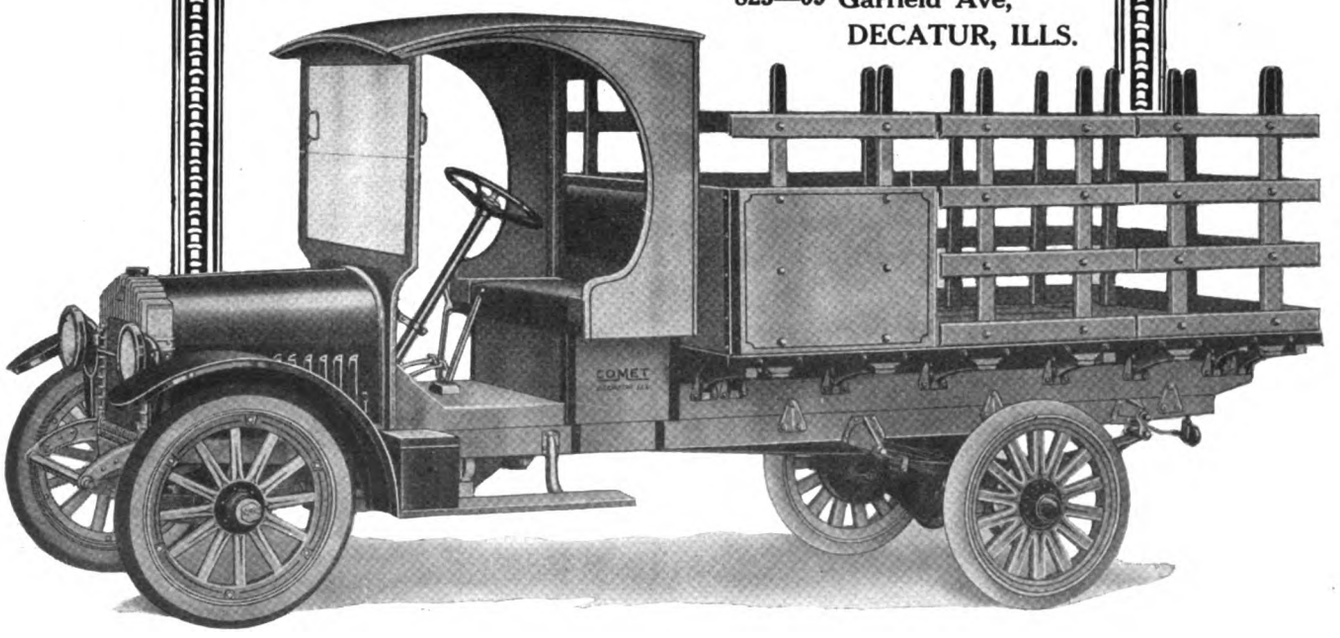
'Tis only seldom that the spirit of the ancient master-craftsmen is manifest today. But when it is, their handiwork is the modern miracle. They create products that all the world demands.

One place where you will find that perfection as the guiding principle is the COMET factory. And everywhere the Comet Truck has gone its achievements have heralded the work of master artisans.

DEALERS who are interested in a 1½-Ton Truck will find the COMET profitable. Address

COMET AUTOMOBILE COMPANY,

823—69 Garfield Ave,
DECATUR, ILLS.



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Says States Favor Use of War Trucks for Road Improvement

Highway work throughout the United States will soon be employing $80,000,000 worth of motor trucks saved from the wreckage of war. This property salvaged from the War Department's supplies is soon to be entirely devoted to the improvement of roads. In addition a vast quantity of material, equipment, repair shops, tools and other supplies bought for the war, and no longer needed, has already been shipped to the highway departments of the states, and other stores are still crowding the army depots.

Within a few weeks it is proposed to urge upon congress the enactment of legislation permitting turning over to the highway departments practically everything left over from the war.

Dr. S. M. Johnson, representing the Bureau of Public Roads, has just returned from a 7,000-mile trip, visiting army depots and conferring with state highway officials. He reports there is a strong opinion through the states that the surplus war property should be used in road work, and that the economic waste entailed by the use of motor vehicles upon road beds in their present condition, should be checked by increases in appropriations for highway work.

To Start Intercity Route

The Illinois State Board of Public Utilities has granted a certificate of convenience and necessity to the Staunton-Livingston Motor Transportation Company, to operate a line of motor trucks between Staunton, in Macoupin County, and Livingston, in Madison County. Passengers, express and freight will be handled and daily service maintained. At present, the two cities are not directly connected by rail lines.

Queen City Undertakers Quicken the Dead by Motorizing Funerals

Horse-drawn funerals have ceased to exist in Cincinnati. The death knell was sounded March 1 and the undertakers are now depending entirely upon the automobile. The last horse-drawn hearse was the property of the Queen City Livery Company, a mutual organization of undertakers to provide funeral equipment. Elegant carriages which, it is said, cost $1,200 originally, can be bought at prices ranging anywhere from $5 to $20.

"The death knell of horse-drawn funerals has come as a result of the preference given automobiles by families of the dead, according to the undertakers. There is no longer any demand for the horse-drawn equippage, and it had become a losing proposition. Horses for the hearse and carriages had to be fed and groomed; drivers had to be kept on the payroll for them, and yet they have been standing idle nearly all the time," said W. B. Dunkmann, president of the company.

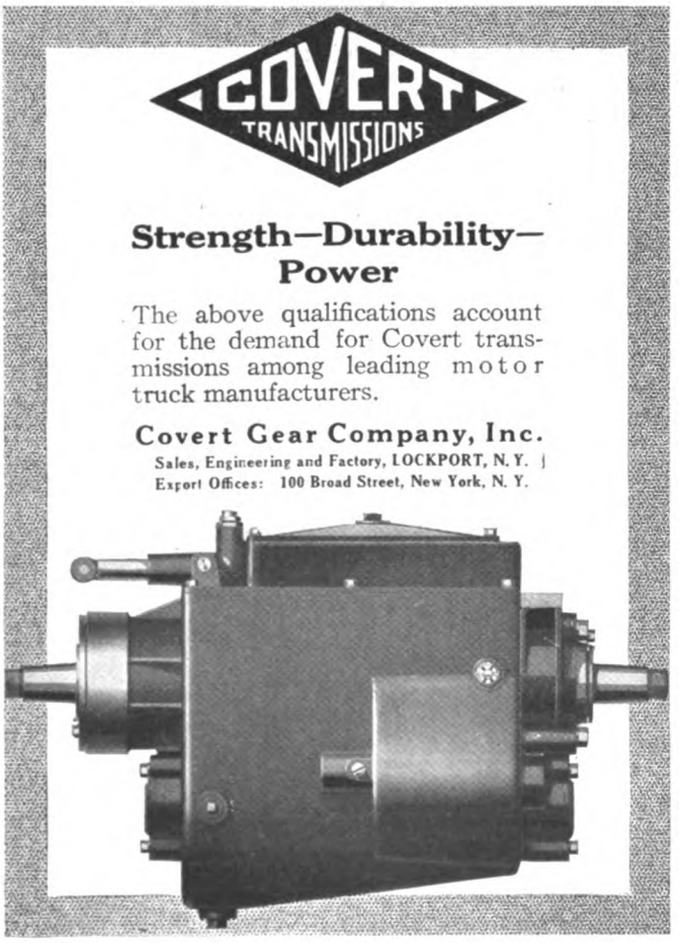
"The automobile has completely displaced the demand for the horse-drawn service. We have sold most of our teams, and junked about 50 carriages. In some instances it was impossible to sell the carriages and we had to send them to the dump and burn them, after taking the tires off the wheels and the hair out of the cushions."

Want Stations Retained

The Joliet Automobile Trades Association, of Joliet, Illinois, voted not to affiliate with the National Automobile Dealers' Association, it being felt that the dues requisite for membership would prevent many of the smaller firms of the city from joining the local association. The dues were fixed at $12 per annum, with payment of $1 monthly. It was argued that this arrangement would attract all of the smaller repair shops. The association will fight an ordinance recently adopted, which requires the removal of all gasolene pumps and air service stations from the sidewalks within the next twelve months.

CLASSIFIED ADVERTISING

FOR SALE—By the Kentucky Lumber Company, Burnside, Ky. 2—Wickes Patent Vertical Water Tube Boilers, 250 H. P. each, 150 lbs. pressure; arch top, Dutch oven fronts and all necessary valves and fittings.



Profitable Side Line for Salesmen

Salesmen who call upon dealers, fleet owners, transportation managers, factory engineers, garages, parts and accessory makers—all who are actively interested in the sale, application, production, equipment or repair of motor trucks—can make from $5.00 to $10.00 a day by exhibiting and explaining the use of a well advertised article which sells almost at sight.

A ten-minute talk will effect a sale.

Commissions only, payable immediately or upon completion of transaction. Sample will be furnished free.

Address W. P.
Care THE POWER WAGON
544 Lake Shore Drive Chicago, Illinois

All replies will be treated in strict confidence. Applicants must state their present trade connection.

Please mention "Power Wagon" when writing to advertisers.

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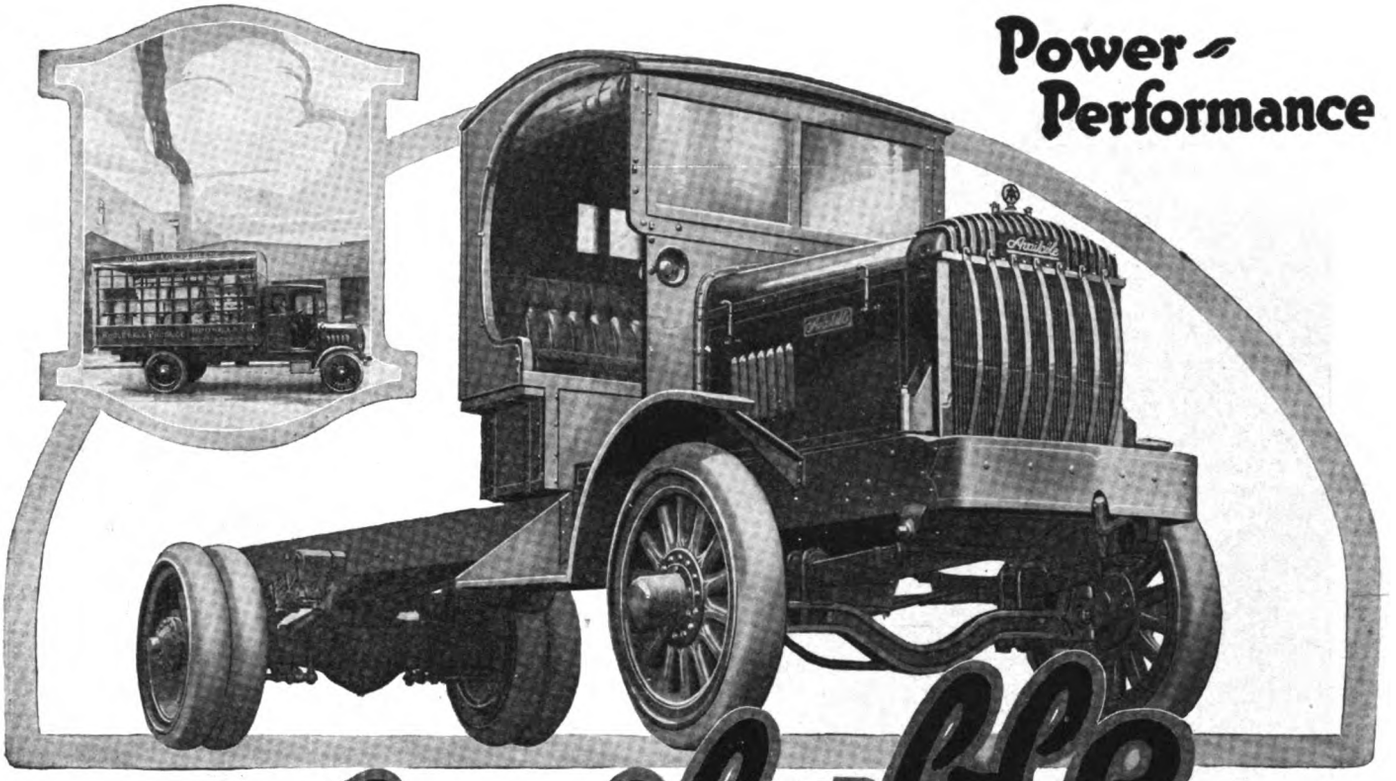


Power Performance

Available Trucks

The Radius Rods

Heavy malleable radius rods extend from rear axle to brackets fastened well forward, and transmit all excess strain direct to frame.

Rocker arm on end of radius rod is connected with swivel in the radius bracket. Bronze bushings are fitted in the bracket with nut and cotter pin. Thus torsional strain is eliminated and radius rods properly pivoted on hardened steel pins, permitting them to swivel in the brackets. Lubrication is effected thru side nipples under pressure.

The brackets are substantially reinforced by vertical ribs and further strengthened by a tie rod connecting them.

By separating the radius rod brackets from the supporting brackets of the rear spring shackles, Available designers have allowed full advantage to be taken of spring resiliency.

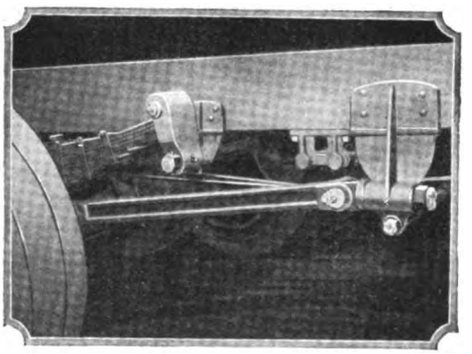
The radius rods are typical of the correct assemblies made by Available engineers. A model for every hauling need—1½ to 7 tons.

AVAILABLE TRUCK COMPANY

General Offices and Factory:

North and Kilpatrick Avenues, Chicago, Ill.

Feature No. 6



Our new 40-page Art Catalog describes all Available models and sets forth their advantages at length. Write Dept. R

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Tell him if he needs new brake lining

YOU can sit down and wait for business to drift in or you can go out and get it.

One of the surest ways of selling brake lining is to show that it is needed. When one of your customers needs new lining, tell him so. You're an expert—point out the condition of his brakes.

And sell him Johns-Manville Non-Burn Asbestos Brake Lining, the lining that makes satisfied customers because it is dependable.

Johns-Manville Non-Burn Asbestos Brake Lining comes to you under a protective sales policy that safeguards your profits. You don't have to carry an enormous stock because you can be sure of getting Johns-Manville Non-Burn Asbestos Brake Lining whenever you need it.

The nearest Johns-Manville branch will tell you who distributes Johns-Manville Non-Burn Asbestos Brake Lining in your vicinity.

Or see your distributor and ask him about the opportunities for you in handling this profitable Johns-Manville product.

H. W. JOHNS-MANVILLE CO.
New York City
10 Factories—Branches in 63 Large Cities
For Canada: Canadian Johns-Manville Co., Ltd., Toronto

JOHNS-MANVILLE SERVICE
COVERS THE CONTINENT

Through

Asbestos

and its allied products

JOHNS-MANVILLE
Serves in
Conservation

Heat Insulations, High Temperature Cements, Asbestos Roofings, Packings, Brake Linings, Fire Prevention Products

JOHNS-MANVILLE AUTOMOTIVE

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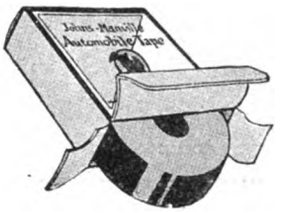
The Jones Recorder

On a chart of sensitized paper, which cannot be tampered with, this instrument records a complete, accurate and permanent history of the performance of your customers' cars, every minute of the day. In addition, the Jones Recorder shows the total mileage up to 9,999 with trip mileage up to 99.9

Johns-Manville Hub Odometer

There is an increasing demand for an accurate but inexpensive mileage recorder that can be attached to business cars and trucks. This instrument will enable you to meet the demand—at an excellent profit.



Johns-Manville Automobile Tape

Here's a tape so good that we guarantee it. Johns-Manville Tape will make satisfied customers for you.

Johns-Manville Automotive Service Sheet

Johns-Manville Automotive Service Sheet can be used at high temperatures and pressures. It is especially adapted for intake and exhaust manifolds and cylinder heads. Made of Asbestos fibre, felted and bonded together with heat-resisting compounds. Will not squeeze out or stick to flanges.

Many dealers are keeping records of their brake lining sales and renewals. They find it pays to periodically remind customers that their brakes need new lining.

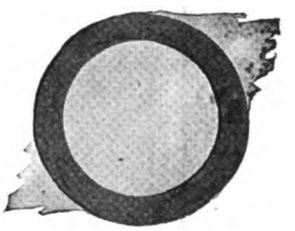
Why not try this on your trade?

Johns-Manville "Noark" Automobile Lighting Fuses

You can back these fuses as absolute safeguards. The name "Noark" means accuracy and dependability.

Johns-Manville Non-Burn Clutch Facings

All the quality, wear-resistance and gripping power that have made Johns-Manville Non-Burn Brake Lining famous, are built into Johns-Manville Clutch Facings.



MANVILLE EQUIPMENT

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The Standard Oil Co., of Nebraska, has just purchased its second fleet of Patriot Trucks. Some time ago after a careful investigation of the performance of the leading makes of trucks and the service rendered on them, Standard Oil bought six Patriots.

The work of these six Patriots proved so satisfactory that the company placed an order for immediate delivery of twenty-five more Patriots. There's just one way to get an order like that—**sell a better truck and back it with better service.**

Surely Patriot is the kind of truck you want to sell.

If we are not represented in your territory, wire or write for our proposition.

HEBB MOTORS CO., Manufacturers

1419 P Street :: Lincoln, Neb.

Revere Model	Lincoln Model	Washington Model
1500 to 2500 lbs. Capacity	3000 to 5000 lbs. Capacity	5000 to 7500 lbs. Capacity

PATRIOT

MOTOR TRUCKS

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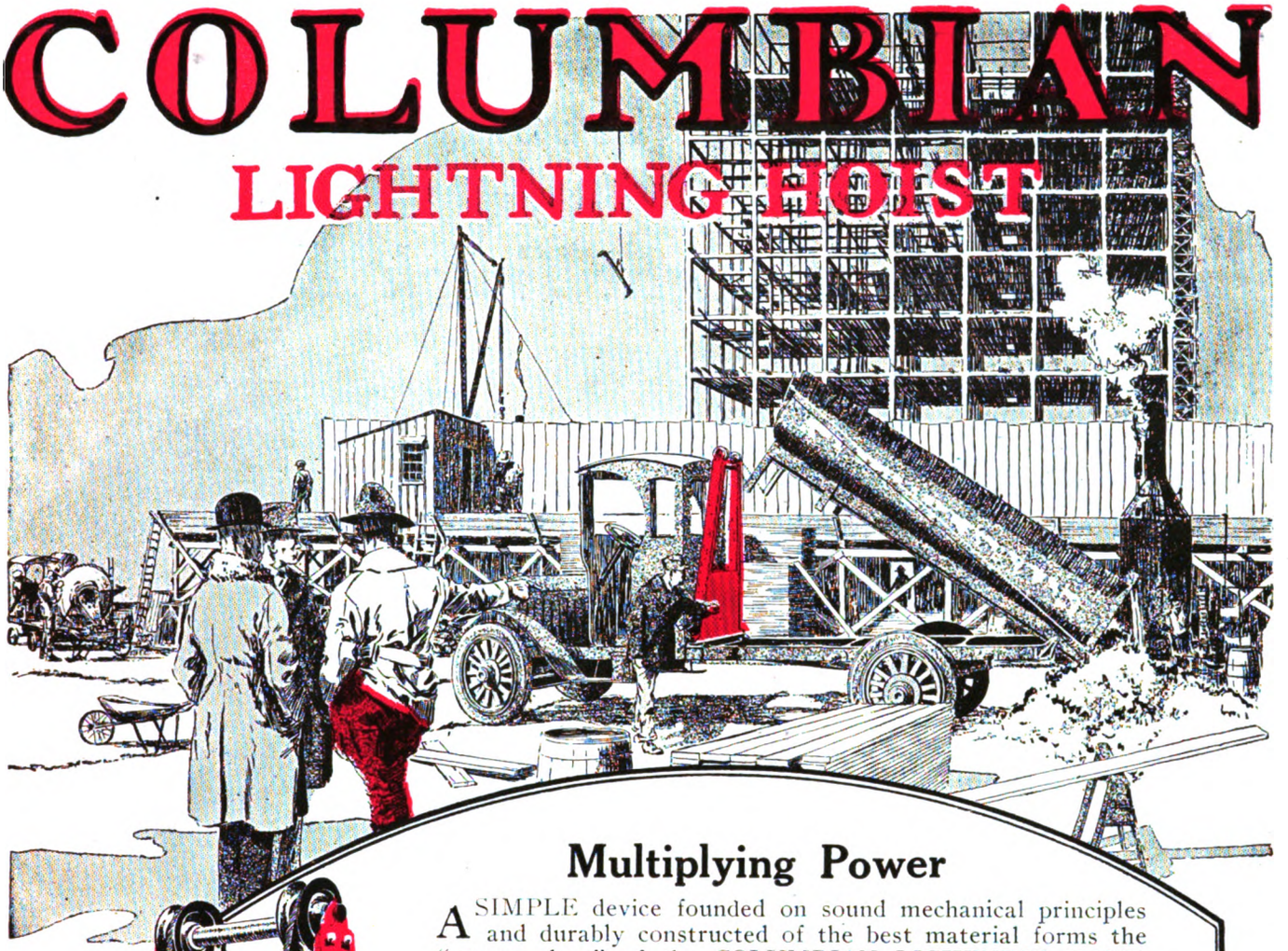
COLUMBIAN
LIGHTNING HOIST



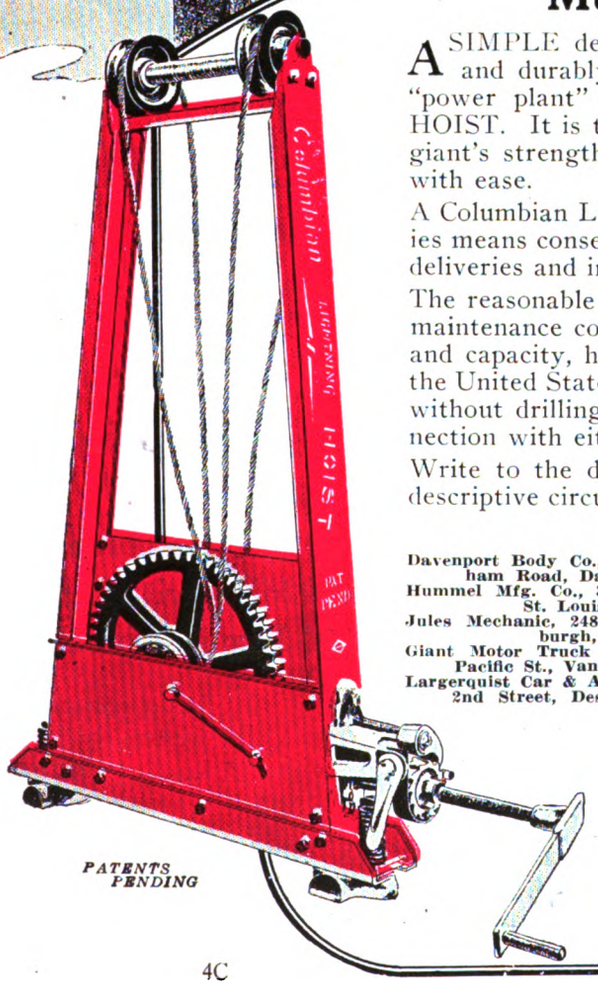
Multiplying Power

A SIMPLE device founded on sound mechanical principles and durably constructed of the best material forms the "power plant" of the COLUMBIAN LIGHTNING HAND HOIST. It is this device which gives the Columbian Hoist a giant's strength, and enables one man to dump a 5-ton load with ease.

A Columbian Lightning Hand Hoist on your truck dump bodies means conservation of high-priced labor, more efficiency in deliveries and increased profits for you.

The reasonable first cost, and almost complete elimination of maintenance costs, together with its power, speed, durability and capacity, have made it the most popular Hand Hoist in the United States today. It will fit any chassis and is mounted without drilling holes in the frame, and can be used in connection with either a metal or wooden dump body.

Write to the distributor nearest to you or to us direct for descriptive circular 8901 and further details.



PATENTS PENDING

LIST OF HOIST JOBBERS:

Davenport Body Co., 1509-33 Bockingham Road, Davenport, Ia.
Hummel Mfg. Co., 3008 La Salle St., St. Louis, Mo.
Jules Mechanic, 248 Croft St., Pittsburgh, Pa.
Giant Motor Truck Co., Granville at Pacific St., Vancouver, B. C.
Largerquist Car & Auto Co., 514 West 2nd Street, Des Moines, Ia.
Albright, S. S., 13th & U. St., Sacramento, Cal.
Beard & Co., 418 Keller Bldg., Louisville, Ky.
Blackwell Motor Co., Cor. 3rd & Post, Spokane, Wash.
Landes & Co., 2nd West & S. Temple, Salt Lake, Utah
Press & Sons, Jacob H., 300 Halsted St., Chicago, Ill.

COLUMBIAN STEEL TANK COMPANY

"Tanks for the World" *Established 1894*

1519-1625 W. 12th St., Kansas City, Mo.

4C

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The Cornfield Resilient Wheel

Pneumatic Results—*And More*—With Solid Tires

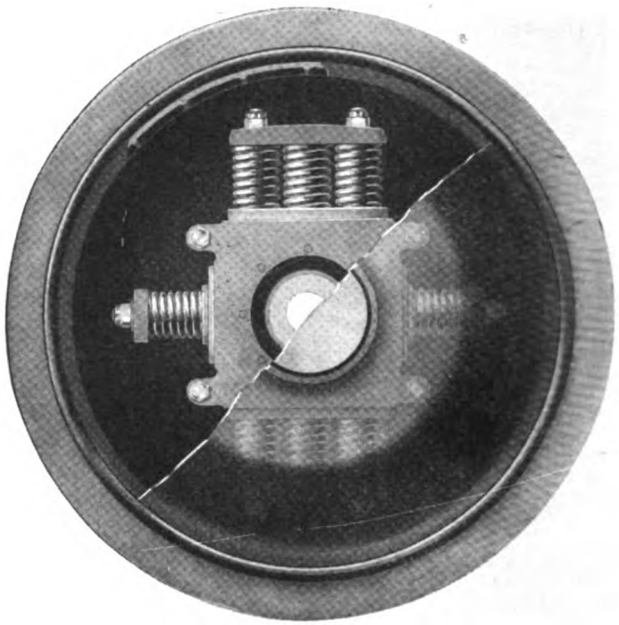
Increase Your Light Truck Efficiency

Prolong the life of tires.
Eliminate the effects of road shocks.
Reduce resistance to motor power.
Reduce danger to the springs.
Keep car out of repair shop.

Light trucks are popular because of their low first cost and low operating cost.

But their efficiency and life is increased when their equipment includes Cornfield Resilient wheels.

These wheels cushion the entire chassis. They absorb the effects of road shocks. They float the entire load and prevent the bounding and rebounding that is so damaging to every part of the truck.

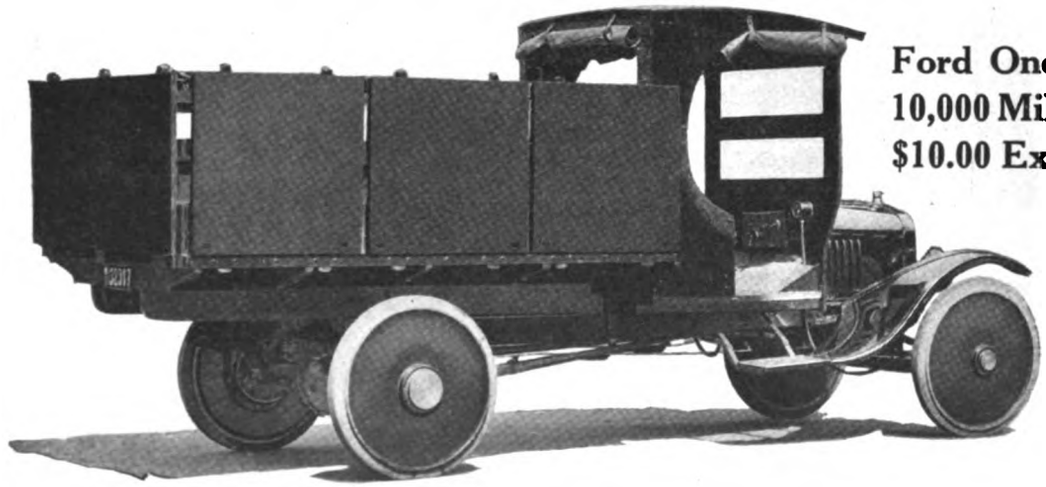


The Spring action is on the axle. Springs do not revolve with wheel.

Cornfield Wheels in Full Sets Are Now Available for Ford One-Ton and Other Light Trucks

Their construction marks a revolution in the building of truck wheels. Their resiliency is due to helical springs which act directly on the axle. Let us send you full information.

Cornfield Wheel Co., Inc., Anna Place, Detroit, Mich.



Ford One-ton Truck Run 10,000 Miles with Less than $10.00 Expense for Repairs

In operation daily, frequently carrying loads of 4,000 pounds, it has shown remarkable economies in gas consumption, and wear on tires.

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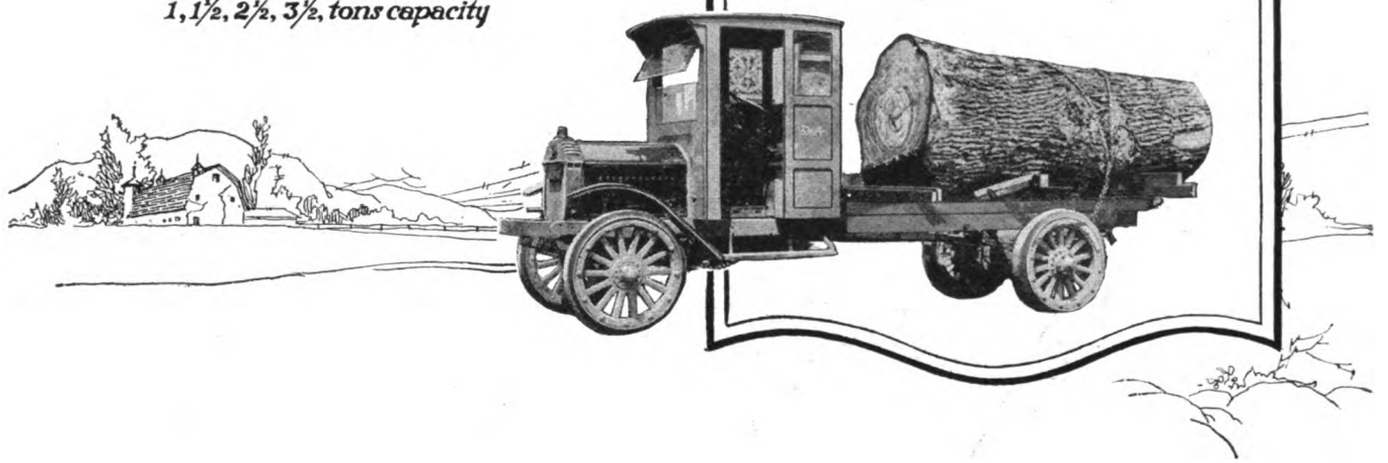
Dart

Worm Drive Trucks
1, 1½, 2½, 3½, tons capacity



Dart Worm Drive for Operating Efficiency

Final drive by worm gear is the accepted standard as the best drive for heavy-duty trucks.

Nearly all trucks that have become famous for the service they give have adopted this drive because of its long life and efficiency—over 53% of *all* trucks built during 1919 were worm drive.

All DART models have worm gear final drive. Its efficiency is extremely high, as it improves with use and gives a straight line drive under almost all loading conditions.

The DART is a Quality truck. It can be depended upon to furnish reliable transportation for the least cost.

MOTOR—DART—BUDA, 4 cylinder, heavy duty type—designed to meet the exacting conditions of heavy service.

DRIVE—Worm gear drive. Most efficient, and improves with use. Gives straight line drive under nearly all loads.

TRANSMISSION—Three speeds forward on 1 and 1½-ton models, four speeds forward on 2½ and 3½-ton models, giving increased operating economy for heavy loads.

Dart Blue "J" Tractors

The DART Blue "J" is the Aristocrat of Farm Tractors.

Sell the Dart

The truck that gives the greatest satisfaction to the user is the truck that you should sell. Find out why the DART has such a large percentage of re-orders —*the sure gauge of truck satisfaction.* Write for specifications.

Dart Truck and Tractor Corporation

Waterloo, Iowa U.S.A

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HAWKEYE
MOTOR TRUCKS

Make Every Road a Right of Way

Hawkeye Trucks are built to stand the stress and strain of transporting capacity loads over unusual roads—doing it successfully day after day without much attention from the driver.

Better trucks mean busier trucks, and busier trucks are more profitable. It pays to sell a better truck like the Hawkeye.

Mud—sand—hills—any road is a right of way to a Hawkeye.

Dealers will be supplied with satisfactory assurance that Hawkeye Trucks deliver as well as our promises. Write for information.

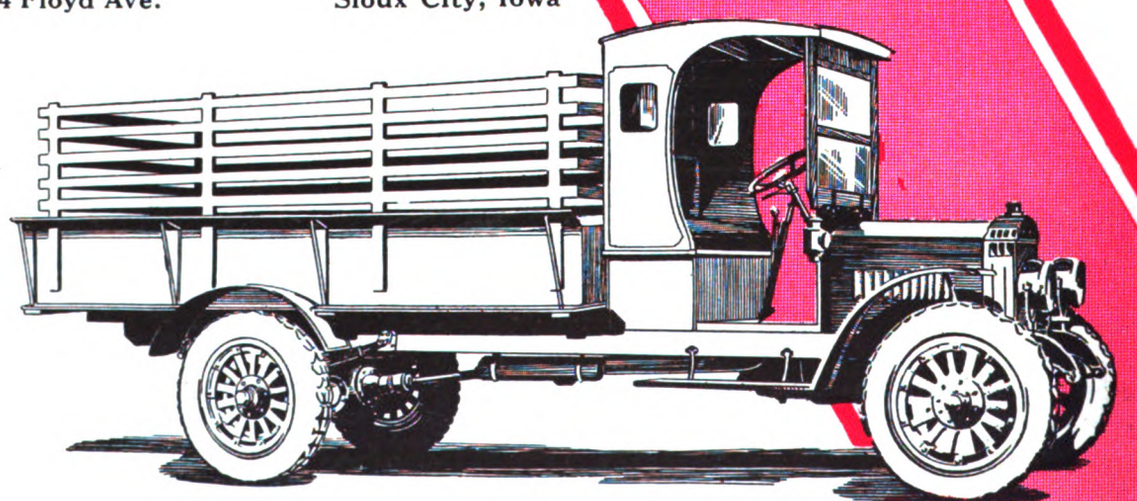
QUALITY TESTED UNITS

Hawkeye Trucks are equipped with such well known quality tested units as the following:

Buda Motor
Clark Internal Axle
Fuller Transmission
Eisemann High Tension Magneto

In addition we make over 170 parts in our own new and well-equipped factory and know they are properly made.

HAWKEYE TRUCK CO.
R. A. Bennett, President
2704 Floyd Ave. Sioux City, Iowa



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MR MARLIN-ROCKWELL INDUSTRIES MR

SRB

Single Row Double Row

ANNULAR BALL BEARINGS

BALL Bearings must be of finer steel, more accurately machined and capable of more critical duty than any other part of an automobile, truck, tractor or other mechanism demanding anti-friction bearings. Yet they do their work hidden away from sight; they must serve without attention or adjustment, yet be permanently proof against failure.

All the more reason why manufacturers of automobiles, trucks and tractors should use bearings of S. R. B. quality.

S. R. B. Ball Bearings and S. R. B. Taper Roller Bearings are used in those motor cars, trucks and tractors, whose names are instantly thought of as leaders in their respective fields.

STANDARD STEEL AND BEARINGS INCORPORATED

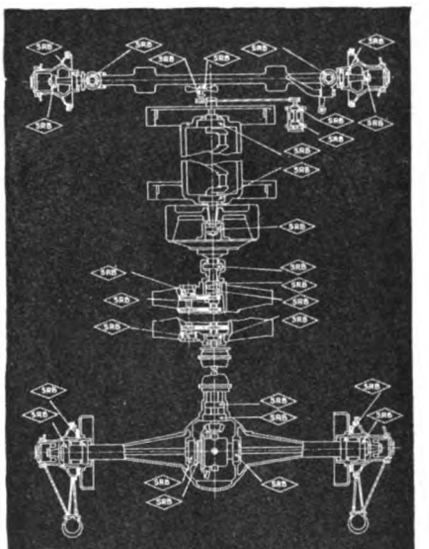
Philadelphia Standard Roller Bearing Co. Plainville, Conn. Norwich, Conn. New Haven, Conn. Pittsburgh Braeburn Steel Co.

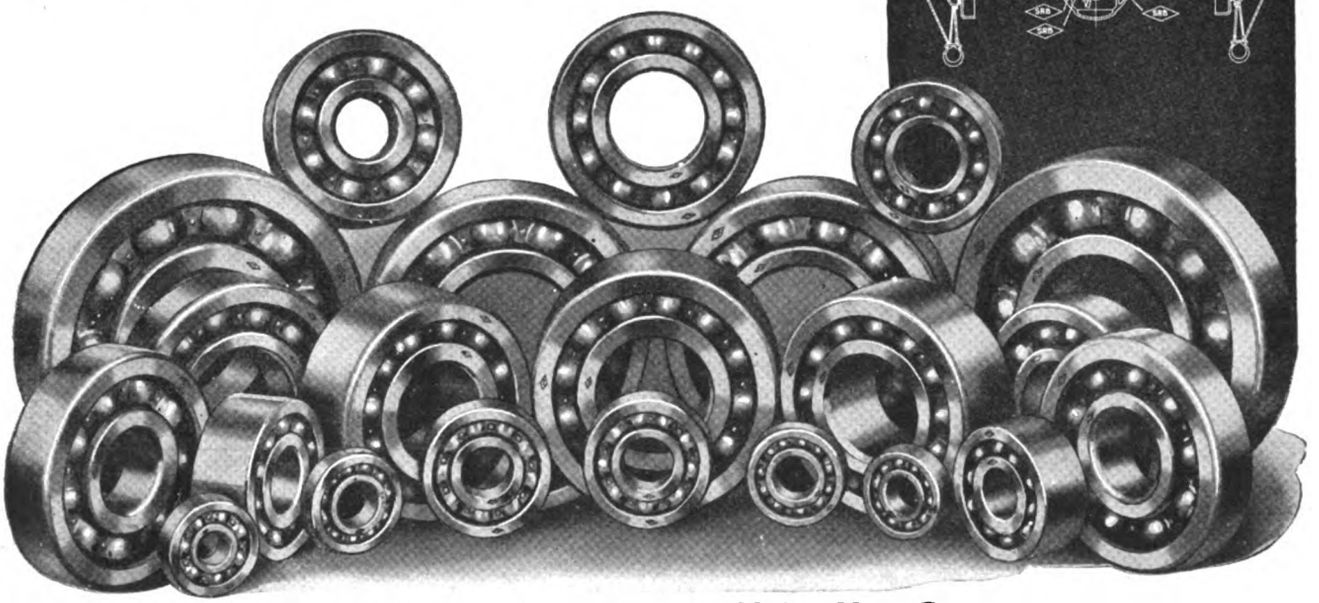
Standard Sales and Service Distributors in Principal Cities

Executive Offices: 347 MADISON AVENUE, NEW YORK CITY

Controlled and Operated by

MARLIN-ROCKWELL CORPORATION





Typical S. R. B. Bearing Equipment for Modern Motor Car

Please mention "Power Wagon" when writing to advertisers.

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EATON

IT IS OUR PURPOSE TO BUILD ONLY SUCH PASSENGER CAR AND MOTOR TRUCK AXLES AS WILL MERIT THE APPROVAL OF THE MORE EXACTING MANUFACTURERS IN THE AUTOMOTIVE INDUSTRY.

THE EATON AXLE COMPANY, CLEVELAND, OHIO
THE AXLE DIVISION OF THE STANDARD PARTS COMPANY

AXLES

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The creation of a great, permanent clientele, enthusiastically anxious to boost Federal trucks wherever trucks are sold, is one of the greatest accomplishments of this first ten years of Federal history.

The fact that this clientele is made up largely of present Federal owners, logically competent to recommend Federals to their friends, and naturally anxious to own more Federals themselves, is in itself an indication of the very tangible value of a Federal franchise.

The Monthly Magazine "Traffic News" Sent on Request

FEDERAL MOTOR TRUCK COMPANY
DETROIT, MICHIGAN

FEDERAL
One to Five Ton Capacities

"The Federal pictured below was purchased ten years ago by the Oakland Pioneer Soda Water Company of Oakland, California. It has been in daily use ever since, and the company has purchased two additional Federals. An idea of its performance may be had from the following telegram from Mr. S. O. Spiro, Vice President of the Company."

"Federal Trucks have accomplished wonders in our business always reliable whether in short or long hauls have given complete satisfaction for the last ten years."

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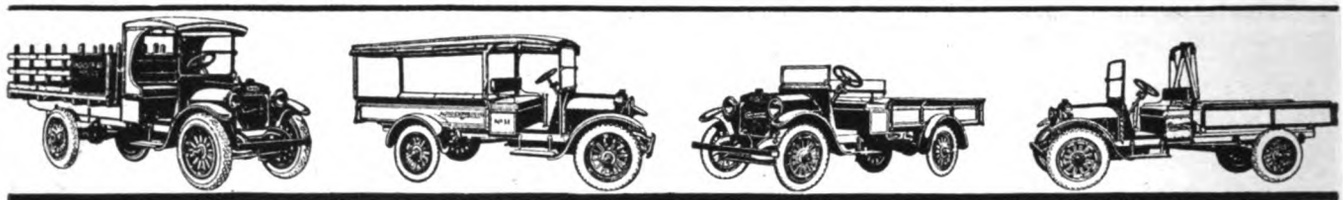


Commerce TRUCKS

THE reputation and dependability of the Commerce Truck carries the endorsement of every owner; the fact that Commerce Trucks are represented in every line of business testifies to the universal demand for them.

Commerce Trucks carry loads up to two tons on big pneumatic cord tires that cushion truck and load, increase speed, reduces gasoline cost and repair cost.

If Commerce Trucks are not sold in your locality now is your opportunity to establish relations that will be decidedly profitable.

Distribution of Commerce Trucks will be spread over Nation Wide Territory instead of concentrating in Trade Centers.

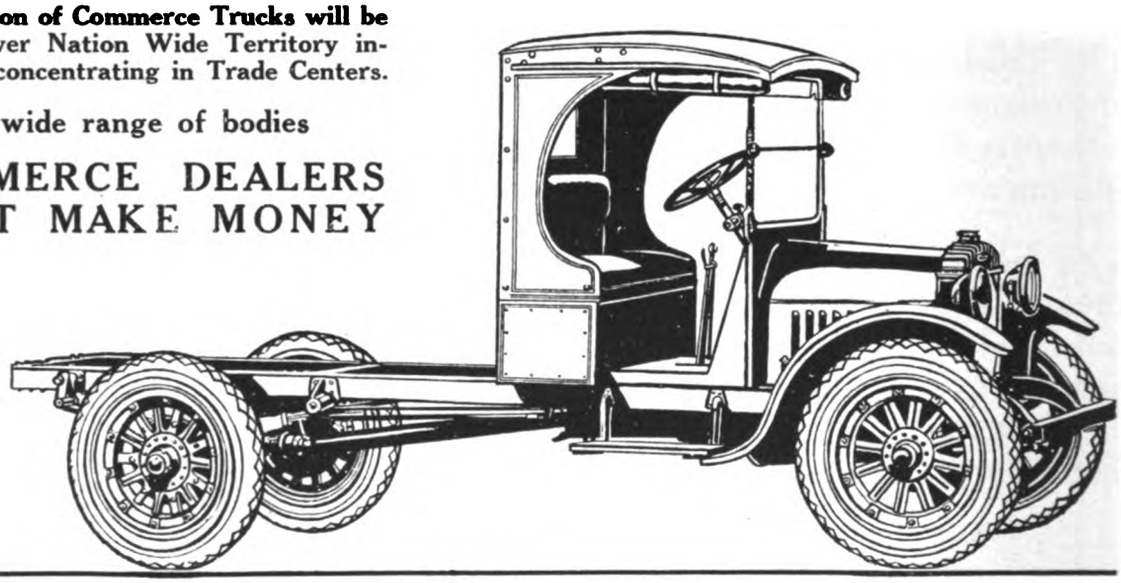
A wide range of bodies

COMMERCE DEALERS MUST MAKE MONEY

NATIONAL

Ship By Truck

Good Roads Week
May 17 to 22 Inclusive



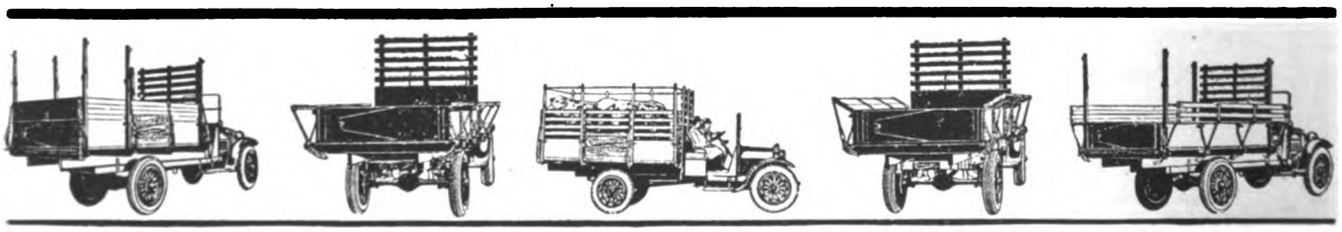
Chasses
Prices

$1690 to $2065
Cab Top Extra
F. O. B. Detroit

Two Chasses
1-1½ Tons, 1½-2 Tons
Capacities

THE COMMERCE MOTOR CAR COMPANY, DETROIT, MICHIGAN

Largest Exclusive Manufacturers of 1 to 2 Ton Trucks in America



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BROWN-LIPE GEARS

BROWN-LIPE GEAR TRANSMISSIONS

IN Brown-Lipe gears there is no striking as the teeth engage, no dragging as they separate—just the smooth, frictionless action of one rounded surface upon another.

This freedom from both noise and loss of power is due to the true involute curvature of the gear teeth and to their exact uniformity in height, thickness and spacing.

The same high order of engineering, workmanship and mechanical aids that produce this perfect mesh, feature all departments of Brown-Lipe manufacture.

BROWN-LIPE GEAR CO.
TRANSMISSIONS

BROWN-LIPE-CHAPIN CO.
DIFFERENTIALS

Both at SYRACUSE, N. Y.

BROWN-LIPE CHAPIN DIFFERENTIALS

No. 11 of 40 Reasons for Superiority

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DAY-ELDER
Worm-Drive Motor Trucks

Model A
1-1½ tons Capacity Including Weight of Body
3300 Pounds
$1995

Model B
1½-2 tons Capacity Including Weight of Body
4500 Pounds
$2300

Model D
2-2½ tons Capacity Including Weight of Body
6000 Pounds
$2750

Model C
2½-3 tons Capacity Including Weight of Body
7000 Pounds
$2950

Model F
3½-4 tons Capacity Including Weight of Body
9000 Pounds
$3700

Model E
5-6 tons Capacity Including Weight of Body
14,000 Pounds
$4600

Clearly and Emphatically, The DOMINATING Value

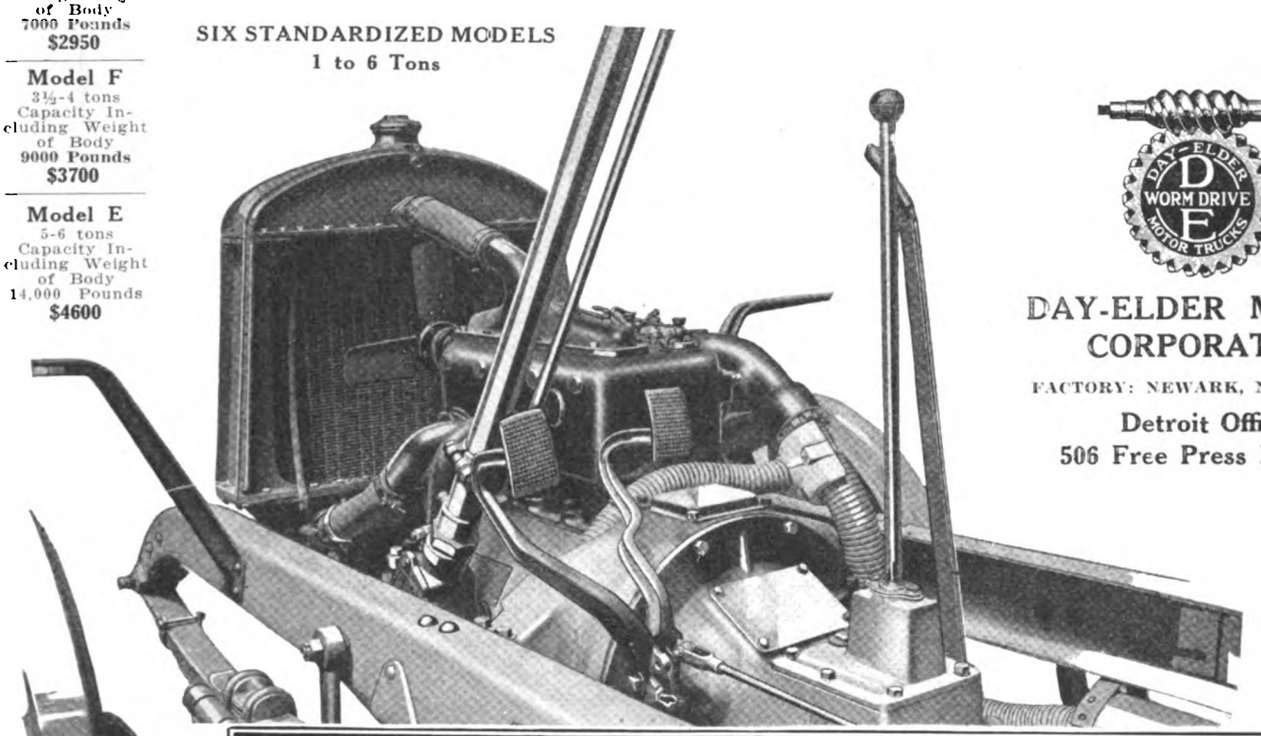
From a humble beginning, DAY-ELDER trucks have gradually forged to the front, until today they are reckoned as a factor in the industry and the dominating value among all worm-drive motor trucks.

Today they are a familiar sight on the highways of commerce the world over. The sun never sets on them.

The world-wide recognition which they have attained could never have been won in any other way except by producing a truck which was fundamentally correct in design and construction, embodying none but the finest materials and built to render the limit of service at the minimum of maintenance cost.

If that is the kind of a truck you want to SELL, communicate with us. Our dealer proposition is most liberal and our service all that you could desire.

SIX STANDARDIZED MODELS
1 to 6 Tons



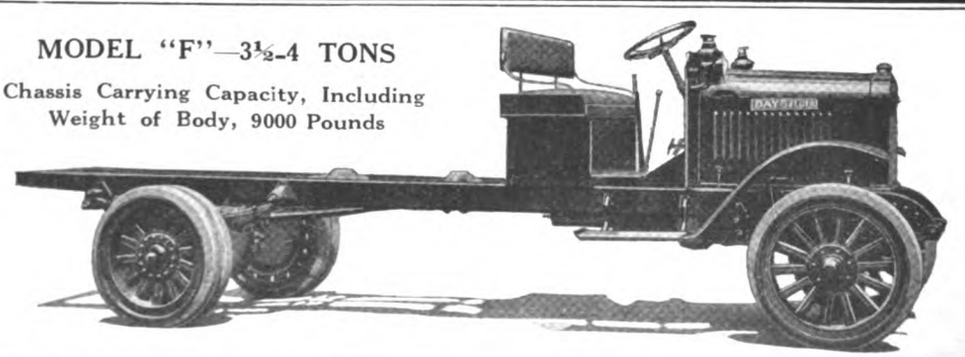
DAY-ELDER MOTORS CORPORATION

FACTORY: NEWARK, N. J., U. S. A.

Detroit Office:
506 Free Press Building

MODEL "F"—3½-4 TONS

Chassis Carrying Capacity, Including Weight of Body, 9000 Pounds



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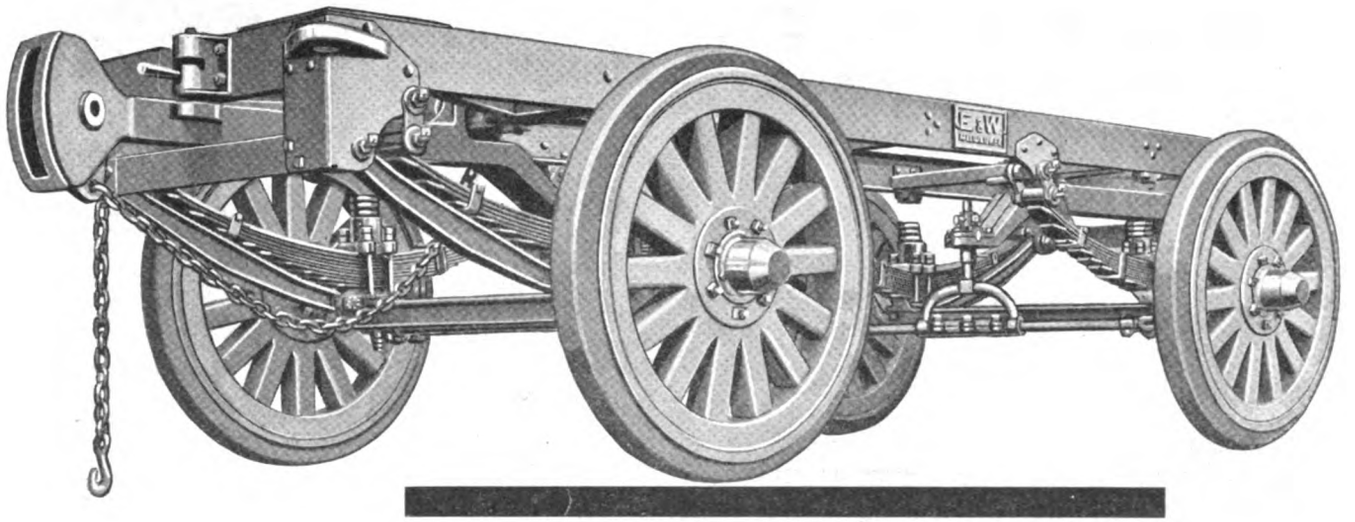

The greatest trailer value on the market

The E. & W. Trailer is equipped with radius rods that relieve the springs—also ***prevent the trailer from side-swinging and snaking.*** And the E. & W. direct draw bar pull further insures ***true tracking.***

The E. & W. Trailer is not a drag on the truck's power, and will carry full load at full truck speed without straining the motor.

There are other ***built-in*** reasons why the E. & W. is the greatest trailer value on the market. Write now for details.

2½, 3½, 5-TON, Reversible Types
Note Sturdiness of Materials and Design

DEALERS—Write now for attractive arrangement for your territory.

E. & W. Truck Units

make a truck from any passenger car. Not a makeshift, but a 100% truck. 18 styles, 1 to 5-TON, internal gear and worm drive. Fully illustrated descriptive literature sent on request. Write now.

E. & W. Company

Manufacturer

MILWAUKEE, WISCONSIN, U. S. A.

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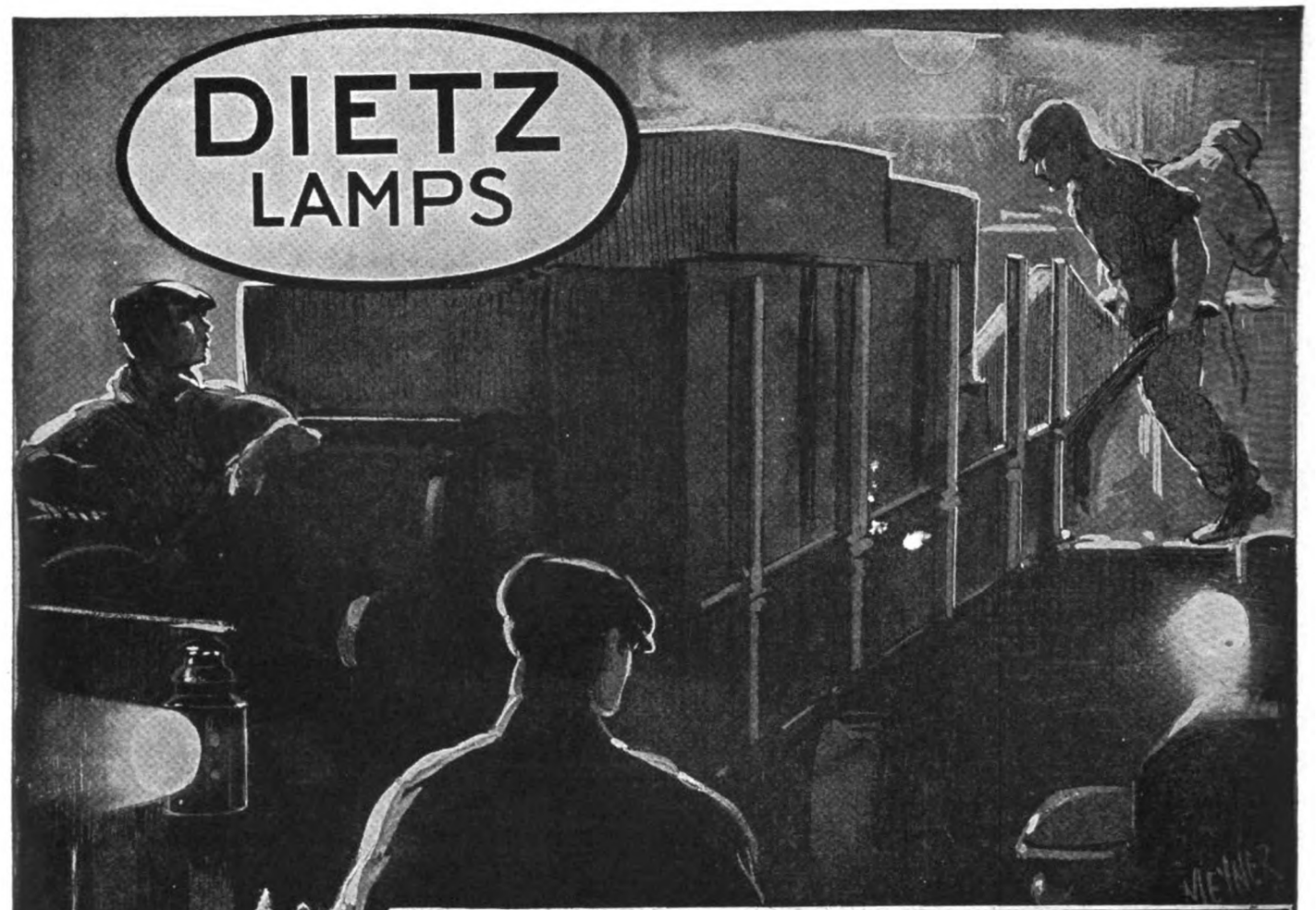
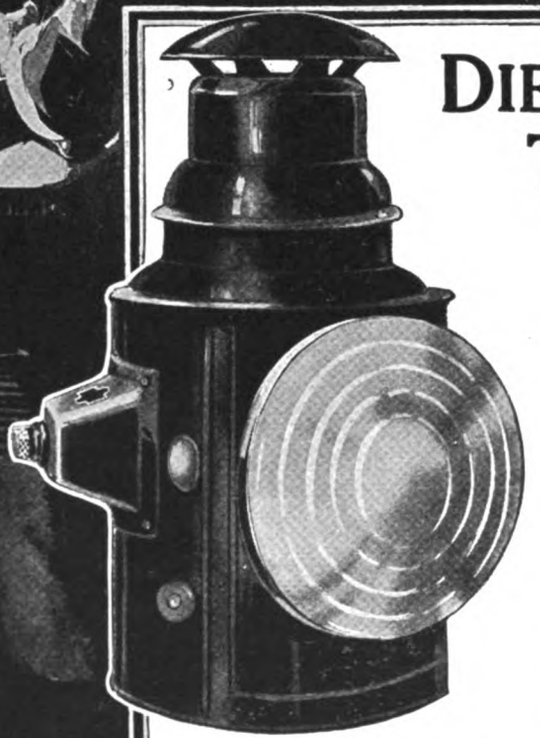
DIETZ LAMPS





DIETZ "MONITOR" TRUCK LAMPS

(For Kerosene)

WHY THEY SELL

THE demand for Dietz *Monitor* Side and Tail Lamps has "just growed," like Topsy. But not without reason—there are always reasons and here are a few:

1. When lit they stay lit.
2. They stand up under road pounding.
3. Suitable for use on either heavy or light tonnage trucks.
4. Moderate price.

Dietz *Monitor* Side and Tail Lamps are 9¾ inches high. They give an 8 candle-power light for 14 hours. Equipped with an unlosable inside oil fount. Side lamps have a powerful optical lens.

Send for Catalog

R. E. DIETZ COMPANY 60 LAIGHT STREET, NEW YORK

Founded 1840

JAMES BARNES, Sales Manager, Motor Truck Lamp Dept., Carter Bldg., Rochester, N. Y.

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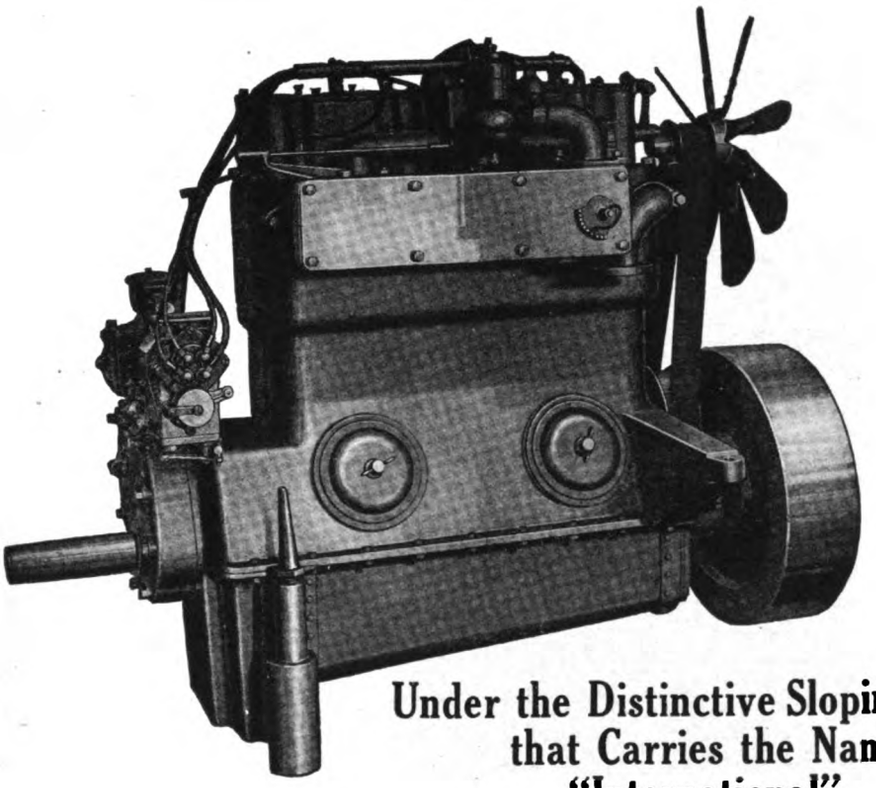

Under the Distinctive Sloping Hood that Carries the Name "International" are the Qualities that Make the Truck Go and Go and Go

Special qualities which we demonstrate in the really famous engines of **International Motor Trucks** are not all minor and technical ones. They are big factors making for truck-long-life, accounting for the years of International truck predominance, igniting the interest and then the enthusiasm of truck-dealer and truck-user.

For ninety years (less one year) this Company has been gaining in skill, guarding and never lowering standards, while manufacturing high-grade machines. For fifteen years it has been expending skill and experience in building engines for heavy-duty service. The trucks it offers are International-designed and International-built—throughout.

Today many thousands of Internationals, thickly scattered through the business world, are cutting the costs of hauling to a point that cannot now be surpassed. A chapter in their success is to be found and studied wherever there is an International at work. The owner you next run across may use one International or he may be the owner of a large fleet. One concern uses over 800 International trucks in the distribution of its products. Fleet owners analyzed and compared and *knew the facts* you may be sure, before they invested in **International Motor Trucks** as the best solution of their transportation problems.

The future for **International Motor Truck** and dealer is one of certain success. International sizes range from ¾-ton to 3½-ton. This is an opportunity of special note. Write the address below for all facts in regard to International service, dealer terms, territory, etc.

INTERNATIONAL HARVESTER COMPANY

OF AMERICA INC.

CHICAGO U S A

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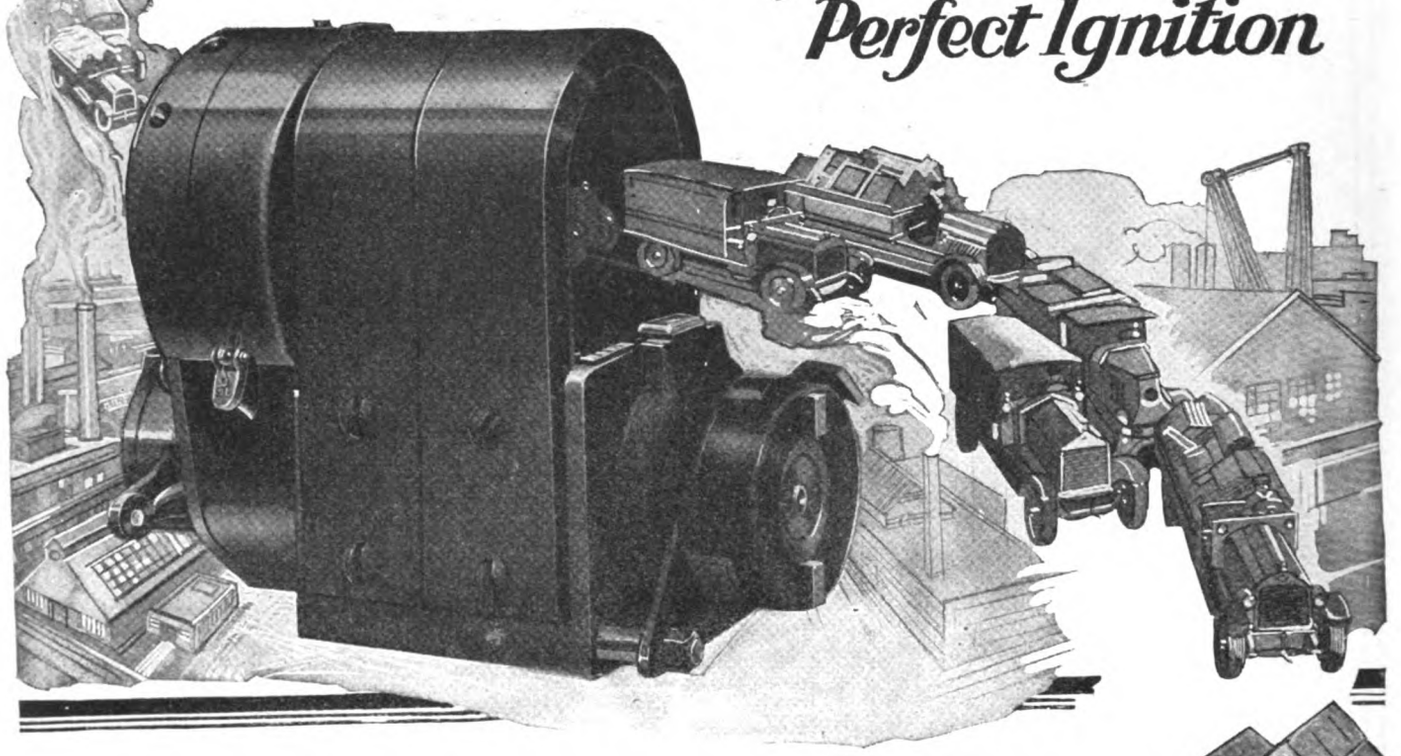
Thru the EISEMANN Magneto

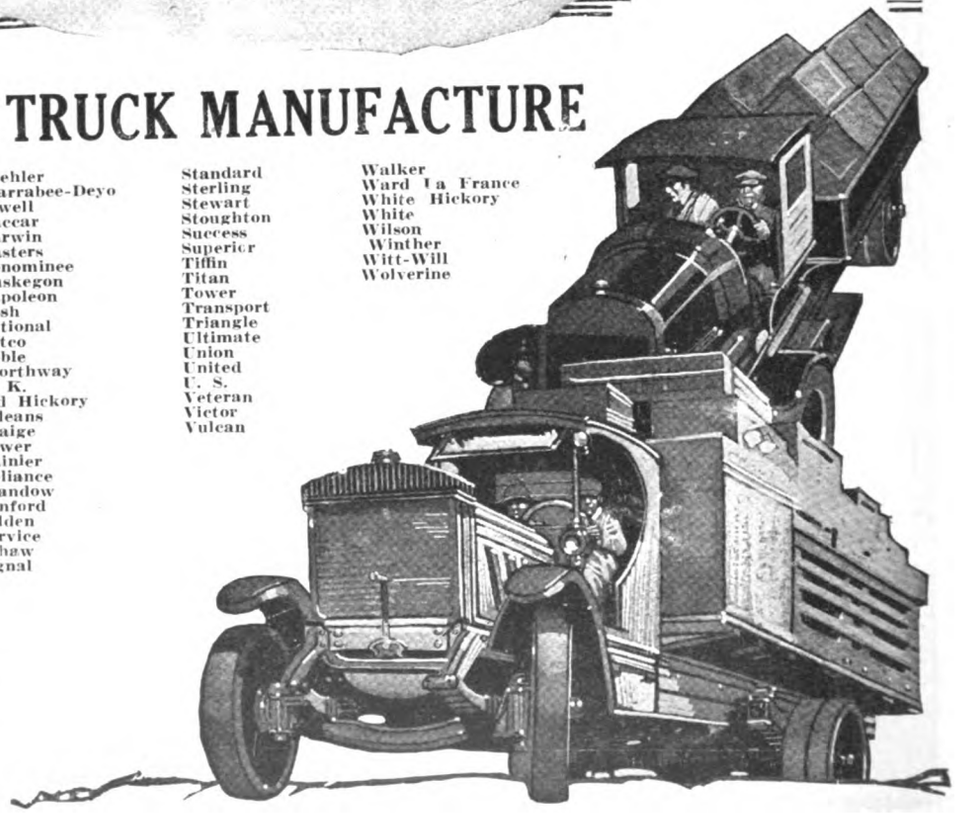
107 Truck Manufacturers Secure Perfect Ignition



"WHO'S WHO" IN TRUCK MANUFACTURE

Acason
*Ace
Acme
All-Power
American
American La France
Apex
Ateo
Bell
Brockway
Burford
Capitol
Collier
Commerce
Concord
Corbit
Dart
D-E
Defiance
Denby
Detroit
Douglas
Dual
Duplex
Eagle
Famous
Federal
F. W. D.
*Garford
Gary
Giant
G. M. C.
Graham Brothers
Gramm-Bernstein
*Hahn
Hal-fur
Hall
Harvey
Hawkeye
Highway
Higrade
Huffman
Hurlburt
Independent
Indiana
Italia
Jackson
Jumbo
Keldon
Kelly
*Kimball
Kissel
Kirby
Knox
Koehler
*Larrabee-Deyo
Lowell
Maccar
Marwin
Masters
Menominee
Muskegon
Napoleon
Nash
National
Netco
Noble
*Northway
O. K.
Old Hickory
Orleans
*Paige
Power
Rainier
Reliance
*Sandow
Sanford
Selden
Service
*Shaw
Signal
Standard
Sterling
Stewart
Stoughton
Success
Superior
Tiffin
Titan
Tower
Transport
Triangle
Ultimate
Union
United
U. S.
Veteran
Victor
Vulcan
Walker
Ward La France
White Hickory
White
Wilson
Winther
Witt-Will
Wolverine

*Optional



THE EISEMANN MAGNETO CORPORATION
BROOKLYN, N. Y.

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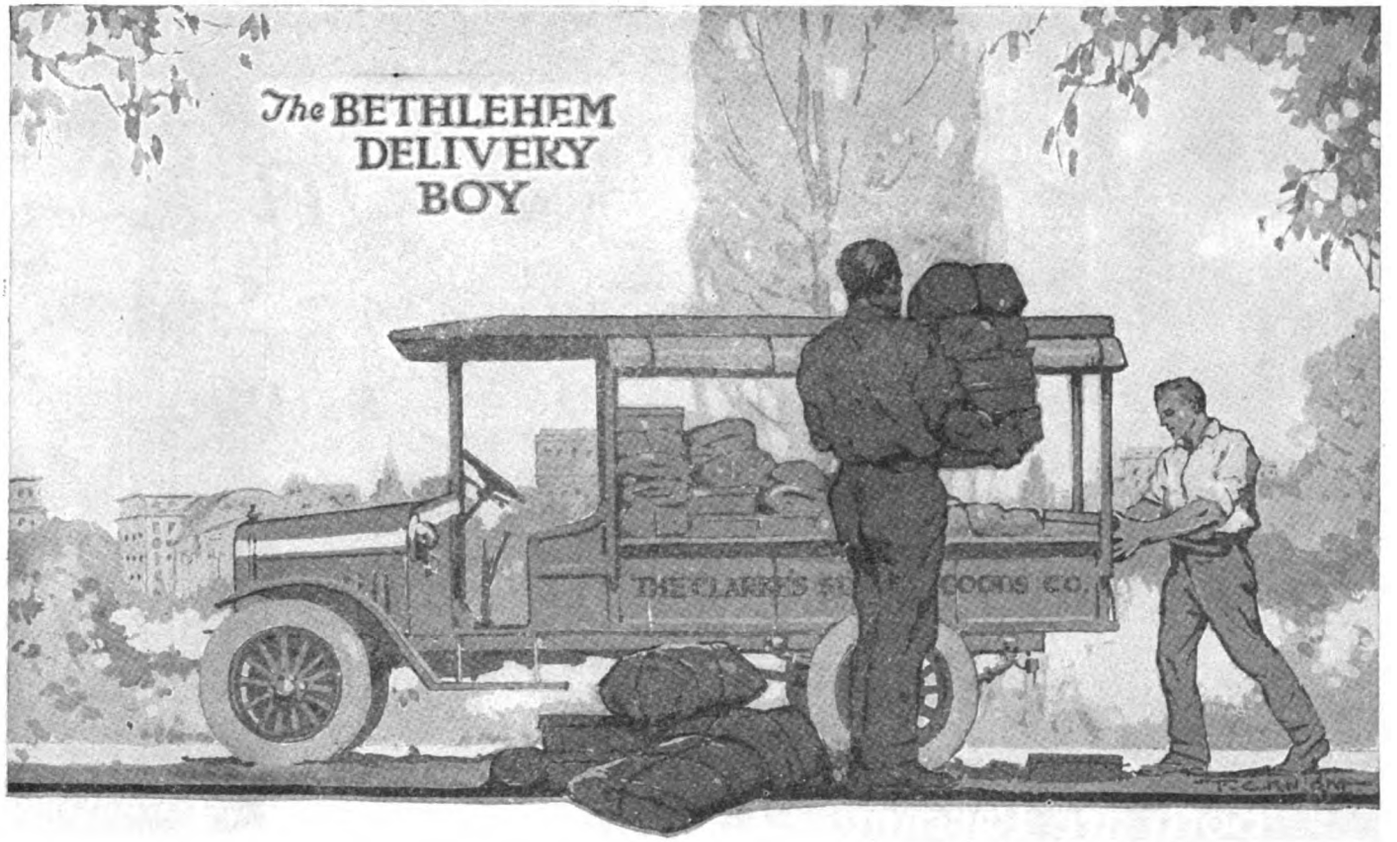

Completing the Bethlehem Line

THE new Bethlehem Delivery Boy completes a line of motor trucks which enables a dealer to most profitably cover the field.

If you will analyze the Bethlehem line and the truck market, you will find the greatest demand concentrated in Bethlehem capacities. Is your territory open?

Delivery Boy Chassis	2½ Ton Chassis
1½ Ton Chassis	3½ Ton Chassis

BETHLEHEM MOTORS CORPORATION

Allentown **Pennsylvania**

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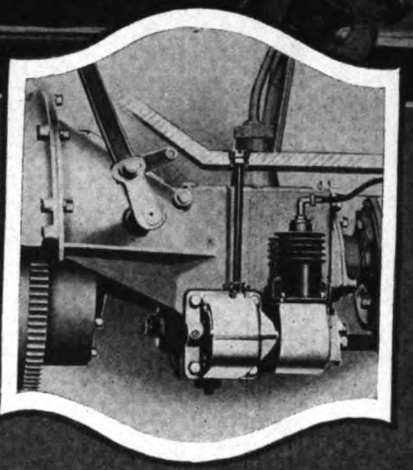

"Both are Passenger Cars"

THE light sport car and the 5th Avenue Bus are both passenger cars—but what a difference! Where the ordinary tire carrying an air pressure of 60 to 90 pounds will do for the passenger car, the heavy bus when it uses pneumatics must adopt the masterpiece of the tire maker's craft, the giant pneumatic with its pressure of from 150 to 175 pounds.

And yet the terrific pressure requirements of this big "passenger car's" tires can be met by the same make of air compressor as has served so well for its little brother—the Kellogg Engine Driven Tire Pump.

KELLOGG MFG. COMPANY

Rochester N. Y.

KELLOGG Engine Driven Tire Pump

Please mention "Power Wagon" when writing to advertisers.

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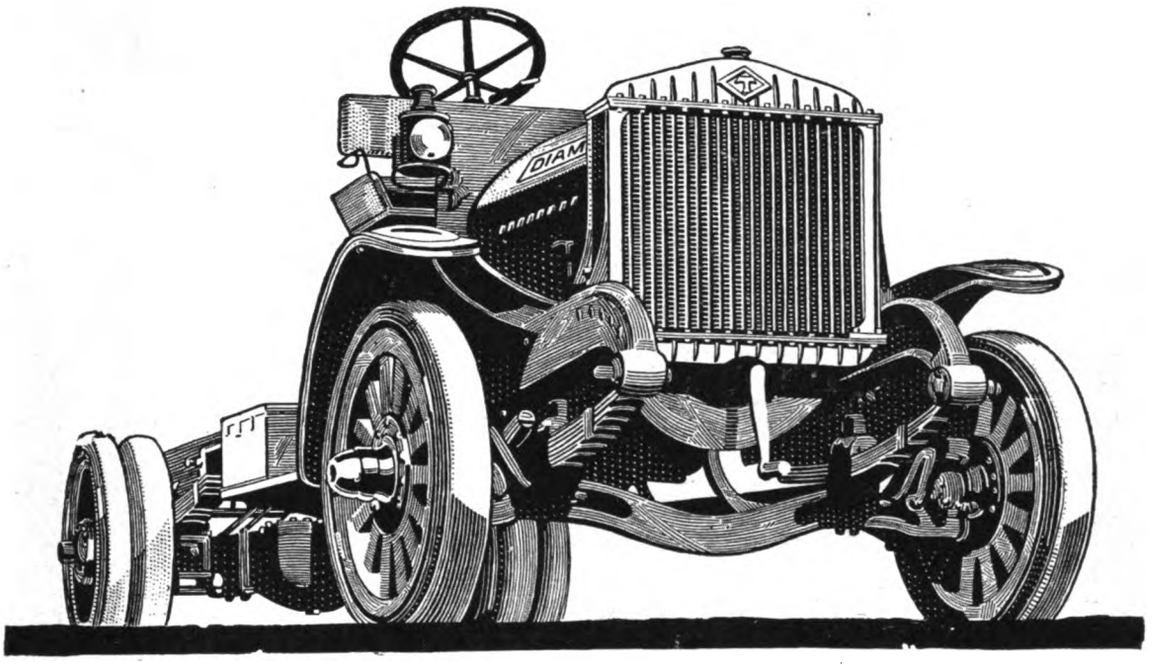

The Strongest Sales Argument!

It is the man who moves the freight at lowest cost that gets the business. When all is said and done, that is the one big factor in clinching a sale. Dealers can talk until they are blue in the face, but a shrewd purchaser wants to know just one thing: "Which truck will move my freight at lowest cost?"

Cost records covering a period of many years **prove** that Diamond T sales can be made on this basis. And every explanation for their low-final-cost, remember, is in itself a strong and interesting selling point.

"The Nations Freight Car"

is full of logical "reasons why."

If you are the type of man we would like to have as one of our sales representatives, it is needless for us to tell you what such **facts** mean to a dealer. Why not write and ask for our dealer proposition?

DIAMOND T MOTOR CAR CO.
4525 W. 26th Street, CHICAGO, ILLINOIS

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A MAXWELL

1½-ton truck gives you five-thousand-dollar truck construction. Five-thousand-dollar truck guarantee. Worm drive. 10-foot loading space. Electric lights and generator. Weight, 2400 pounds.

Please mention "Power Wagon" when writing to advertisers.

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Reliable Motor Statistics

Our yearly summaries and monthly reports tell the number of Passenger and Commercial Cars registered. They can be secured for individual counties, single states or the entire United States.

Passenger Cars or Trucks

This gives you a complete analysis of any given territory or the country as a whole. By using them you can pick out the strong and the weak places in your organization, keep an accurate check on each dealer, and know whether he is getting his share of the possible business or whether it is going to his competitor.

Mailing Lists

In addition to the statistical service, we are in position to furnish lists of Passenger Car, Ford and Truck Owners according to your own specifications. We have a special list of Truck Fleet Owners in the United States, operating from three to ten or more trucks.

Write Today

for the 1920 edition of our free book of automobile, motor truck and motorcycle statistics. Let our organization of 400 people aid you in making a more intelligent analysis of your markets and your selling problems, as well as relieve you of the burdensome details of your mailing campaigns.

Motor List Company

Home Office: 405 Grand Avenue
DES MOINES, IOWA
MARTIN TUTTLE, Proprietor

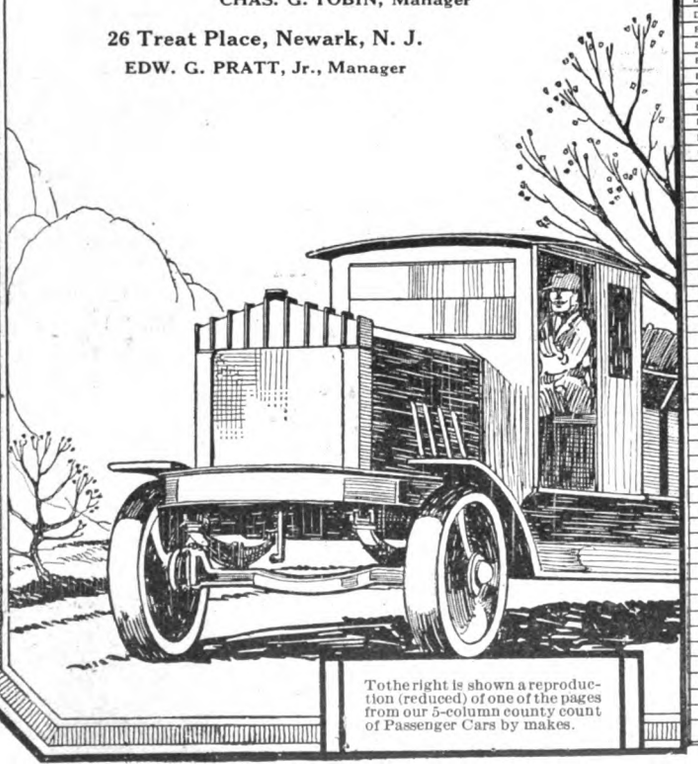
BRANCH OFFICES:

310 Marquette Building
Detroit, Mich.

636 Huron Road
Cleveland, Ohio

CHAS. G. TOBIN, Manager

26 Treat Place, Newark, N. J.
EDW. G. PRATT, Jr., Manager



To the right is shown a reproduction (reduced) of one of the pages from our 5-column county count of Passenger Cars by makes.

STATE Iowa COUNTY Polk

PASSENGER CARS	1915 TOTAL	1916 Incr.	1916 Total	1917 Incr.	1917 Total	1918 Incr.	1918 Total	1919 Incr.	1919 Total
APPERSON	47		24		29		43		59
BRISCOE	2		9		13		32		40
BUICK	380		457		516		607		694
CADILLAC	271		334		364		354		443
CASE	19		21		25		30		24
CHANDLER	154		261		255		262		231
CHALMERS	10		38		85		108		117
CHEVROLET	85		214		334		455		627
COLE	35		44		63		58		72
DODGE	49		152		320		438		596
DORT			7		9		9		14
ELGIN									7
ESSEX									30
FORD	1788		2916		4562		5174		5074
FRANKLIN	10		13		23		40		88
GRANT	10		13		23		43		55
HARROUN									3
HAYNES	29		86		171		204		206
HUDSON	125		198		236		296		316
HUP	104		145		192		190		242
JACKSON	56		63		62		57		58
JORDAN							1		9
KING	24		36		29		37		35
KISSELL	6		17		20		28		31
LEXINGTON									61
LIBERTY					2		7		10
LOCO	14		15		16		9		14
MARMON	4		8		8		9		19
MAXWELL	196		272		315		414		426
MERCER									5
MITCHELL	40		49		39		53		64
MOON	13		29		25		16		19
NASH	73		133		146		152		128
NATIONAL	13		18		19		44		43
OAKLAND	65		100		130		148		223
OLDS	35		72		102		120		173
OVERLAND	387		593		655		702		772
PACKARD	40		61		80		82		73
PAIGE	63		94		148		158		229
PEERLESS	20		16		14		15		38
PIERCE	9		13		10		13		12
REO	85		109		109		106		141
SAXON	21		68		141		142		170
SCRIPPS			21		21		20		28
STANLEY									3
STEARNS	6		14		19		36		38
STUDEBAKER	205		328		379		378		392
STUTZ	1		2		9		18		25
VELIE	34		42		63		72		96
WESTCOTT									8
WHITE	43		60		77		85		33
WILLYS-KNIGHT			20		21		35		37
WINTON	22		23		12		7		7
ELECTRICS	184		174		170		143		201
MISC CARS	945		1125		1170		1273		736
TOTAL	5709		8507		11211		12718		13420

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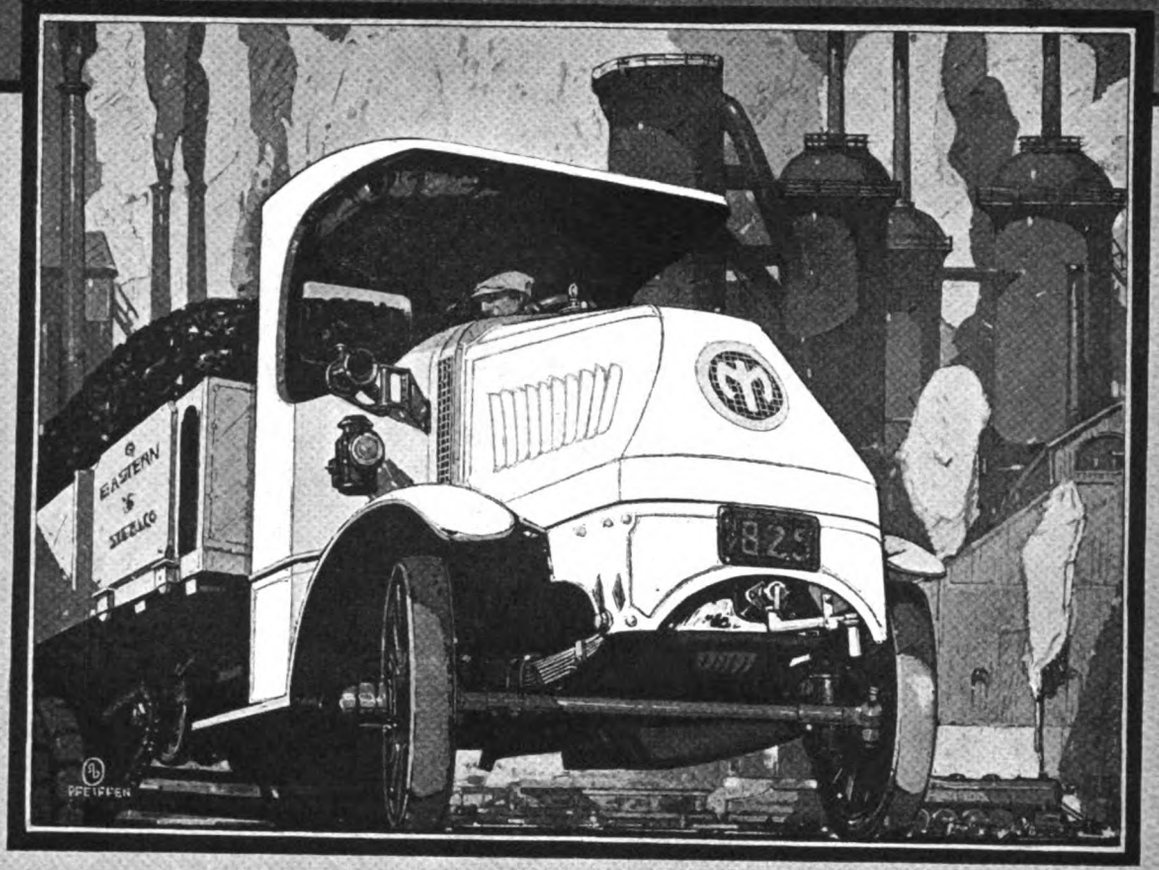
"PERFORMANCE COUNTS"



"This is Mack Quality"

"A *Mack Truck*, after running 100,000 miles in 5 years was sent to the shop for the first general overhaul. The cylinders were examined for reboring; and it was impossible to discover, on all four bores, a variation of more than .0005 of an inch."

HERE is a tribute to a distinctively *Mack* engineering feature which made possible a remarkable combination of mileage and low operating costs. All *Mack* cylinder castings contain a combination of Gray Iron and Graphitic Carbon to assure a perfect bearing surface. Each block is annealed to relieve internal stress. This unusual, special process is a *Mack* engineering detail.

Thirty-seven distinctive engineering features combine to make the *Mack* the motor truck the world is talking about.

Capacities 1½ to 7½ tons.

INTERNATIONAL MOTOR COMPANY, NEW YORK

Mack TRUCKS

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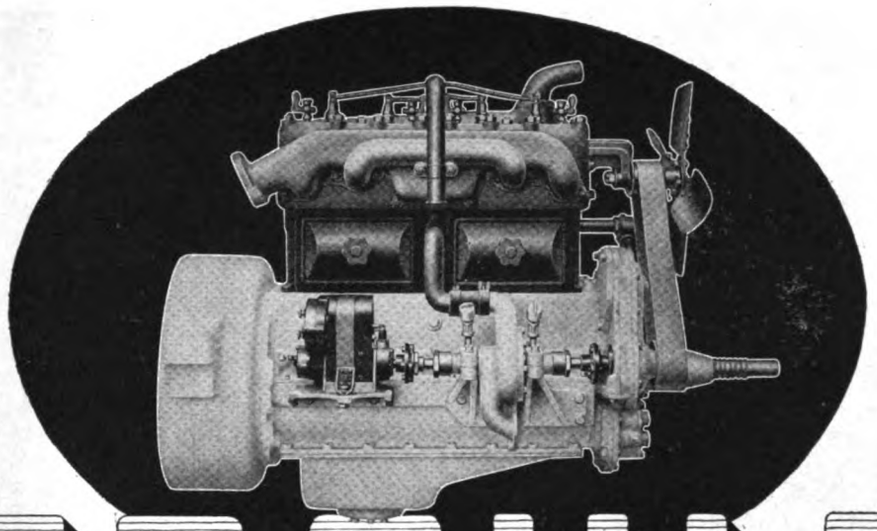
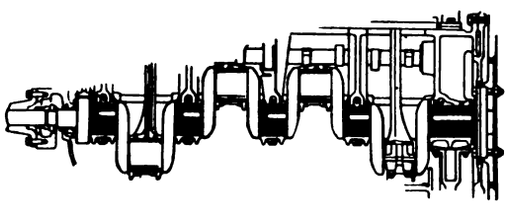


HERCULES

A Firm Foundation



Five Main Bearings—

—eliminate crank arm deflections and the excessive vibrations due to these deflections.

—reduce internal losses and increase the mechanical efficiency.

—maintain extremely low bearing pressures.

—assure almost endless life of bearings.

Hercules Engines are built on a foundation as solid as a rock. Five main bearings of ample size give unyielding support to a crankshaft of such strength that it is impervious to the strains of heavy duty.

Likewise, the firm foundation of efficient organization insures the accurate manufacture and proper delivery of Hercules Engines.

The Hercules Motor Mfg. Company
Canton, Ohio

Sales Offices: Detroit Chicago Buffalo
San Francisco London, England

FOR TRUCKS AND TRACTORS

Please mention "Power Wagon" when writing to advertisers.

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THE ELECTRIC STORAGE BATTERY CO.

Save those wasted hours

Time and labor are valuable—more so today than ever before.

Don't put up with unnecessary waste any longer by continued cranking of your trucks.

Take immediate steps toward more efficient and economic deliveries by equipping your truck **now** with an

"Exide" Starting & Lighting Truck Battery

The battery that was especially designed and constructed to withstand the terrific shock and vibration of service on the Army Tanks

Every inch of the "Exide" is built for power and endurance.

It is the only battery that is made to "stand up" under the continued vibration of solid tired truck service.

It is so constructed that no special mounting is necessary.

It is made by the largest manufacturer of storage batteries in the world.

Get full details from our nearest sales office.

THE ELECTRIC STORAGE BATTERY CO.

1888 PHILADELPHIA, PA. 1920

New York	Boston	Chicago	Denver	San Francisco	St. Louis
Cleveland	Detroit	Washington	Minneapolis	Kansas City	Atlanta
		Pittsburgh	Rochester		

Special Canadian Representatives: Chas. E. Goad Engineering Co., Limited, Toronto; Montreal

Batteries are made by this Company for every storage battery purpose

THE ELECTRIC STORAGE BATTERY CO.

Please mention "Power Wagon" when writing to advertisers.

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Designed and Built for Pneumatic Tires

—No Oshkosh 4-Wheel-Drive Truck has ever been sold with any other tire equipment

The Oshkosh 4-Wheel-Drive Truck *pioneered* in the use of pneumatics. It was designed solely and specifically for the use of pneumatics.

Our guarantee is nullified by the use of solids. We were

First to include pneumatics all around as standard equipment

The benefits of pneumatics are well known. They greatly lessen road shocks; save on repair expense; prolong truck life; reduce slipping; permit greater speed; give increased gasoline mileage.

Due to the use of pneumatics, our engineers attained the wonderful stamina and durability of our truck with less weight than the average weight of all other two-ton trucks.

You buy it complete — all ready to drive — only body needed

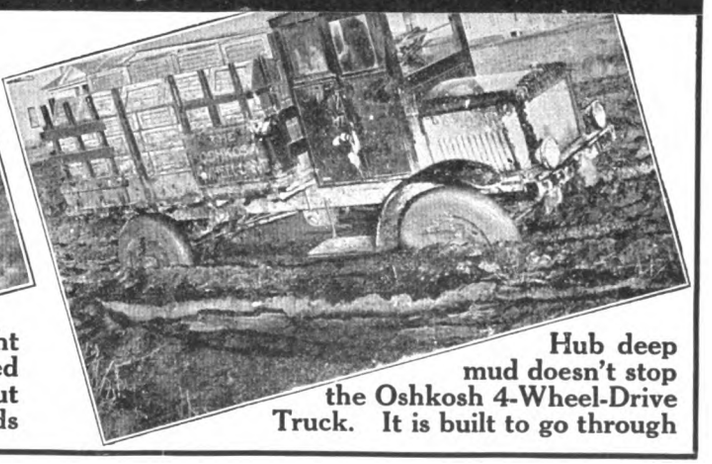
Pneumatic Tires	Electric Starting
Electric Lighting	All weather cab
Electric Horn	Speedometer

—All standard equipment

Oshkosh Motor Truck Mfg. Co.
Oshkosh, Wisconsin

OshkosH 4-Wheel-Drive Truck
Two Ton Capacity

Goes right into ploughed fields and brings out full loads



Hub deep mud doesn't stop the Oshkosh 4-Wheel-Drive Truck. It is built to go through

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The Impulse Starter on the SPLITDORF Magneto—

makes starting safe, sure and easy

WHEN the impulse starter on the Splitdorf Magneto is in operation, the spark is automatically retarded to a point where a "back kick" on the starting crank is impossible, regardless of the position of the magneto timing lever. This makes the starting of even the largest engines absolutely SAFE.

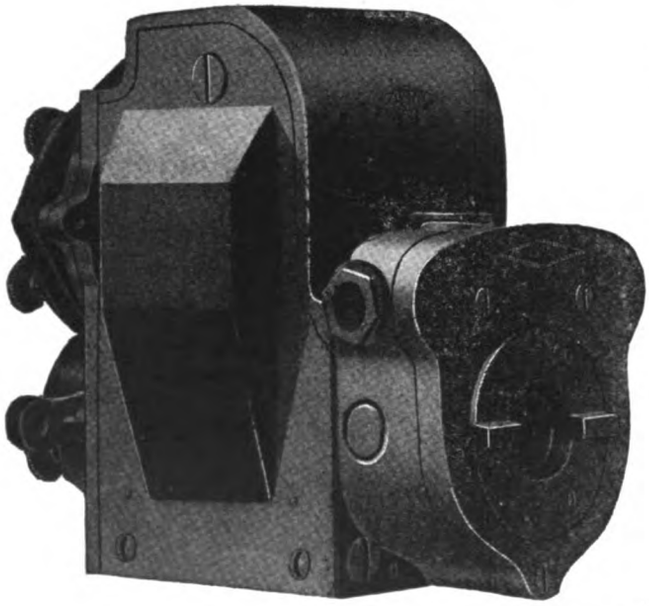
Independent of the speed at which the engine is cranked, the Splitdorf Impulse Starter causes the magneto to deliver the hottest spark it is capable of producing by turning the magneto shaft over 500 revolutions per minute. This fires the mixture in the cylinder, even though it is not exactly correct in proportion, and makes the starting of large engines SURE.

The impulse starter makes it unnecessary to "spin" the engine. A lift of the crank which slowly turns the engine past the firing position is sufficient. If there is a mixture in the cylinder capable of being fired, the engine will start. Thus, the Splitdorf Impulse Starter makes starting EASY.

The Splitdorf Impulse Starter is available in both semi-automatic type B and the enclosed fully automatic type EM.

SPLITDORF ELECTRICAL COMPANY, Newark, N.J.

Splitdorf Aero Magneto with Enclosed Automatic Impulse Starter



TRADE SPLITDORF MARK

Established 1858

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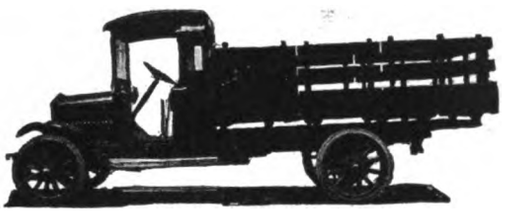
How About The D A Y After ?



Rainier

RAINIER
Worm Drive Delivery Trucks

CHASSIS PRICES
(F.O.B. New York)
Including Equipment as Per Catalogue

Model R-11	— ¾ Ton - - - - -	$1850
Model R-9	— 1 Ton - - - - -	2050
Model R-6	— 1½ Ton - - - - -	2150
Model R-8	— 2 Ton - - - - -	2650

ANOTHER Sale—And—Another Profit *Perhaps!*

In the days after you have sold the truck—when it goes through the wear and tear of service on the road—what happens then?

Does it stand the gaff and hold the road—

Or does it come back from time to time—for tightening up (sometimes the day after!) and later on, for the repairs and replacements that reflect on quality?

If it comes back for any kind of service that costs you time and money you are losing part of the profit on the sale!

In the course of a year many an unfortunate dealer has had his entire profit completely wiped out in just this way. Only the truck that "stays put" on the road yields 100% of the initial profit from the sale.

Now we believe that the reason most dealers have found that the Rainier gives such real satisfaction to both buyer and seller is due to two factors:

1. Because the Rainier is built of standard units (the specifications speak for themselves).

2. Because the truck is designed and constructed with the skill accruing from 18 years of experience with automotive engineering on the part of Rainier executives—and there's a long list of Rainier distributors on five continents for whom the Rainier has made good—to prove the correctness of Rainier construction.

Can YOU swing the Rainier Agency?

Real selling ability is the first consideration—preferred even to a large initial order. The territory offered is exceptional—the contract terms most liberal. Write for details.

RAINIER MOTOR CORPORATION
SALES DEPARTMENT
227 West 58th Street, New York, N. Y.
Factory—Flushing, Long Island, N. Y.

S P E C I F I C A T I O N S

MOTOR—Continental Red Seal in all models

CLUTCH—Brown-Lipe multiple disc

SPRING CONSTRUCTION—Patented double safety shackle on front end of rear springs

TRANSMISSION — Brown-Lipe

REAR AXLE—Timken and Sheldon worm and gear

CARBURETOR—Zenith, with Stewart Vacuum system and Monarch Governor

IGNITION—Simms or Bosch Magneto

WHEELBASE—¾ Ton 125"; 1½ Ton 133"; 2 Ton 147"

LOADING SPACE—¾ Ton 90"; 1½ Ton 9' to 10'; 2 Ton 11' to 12'

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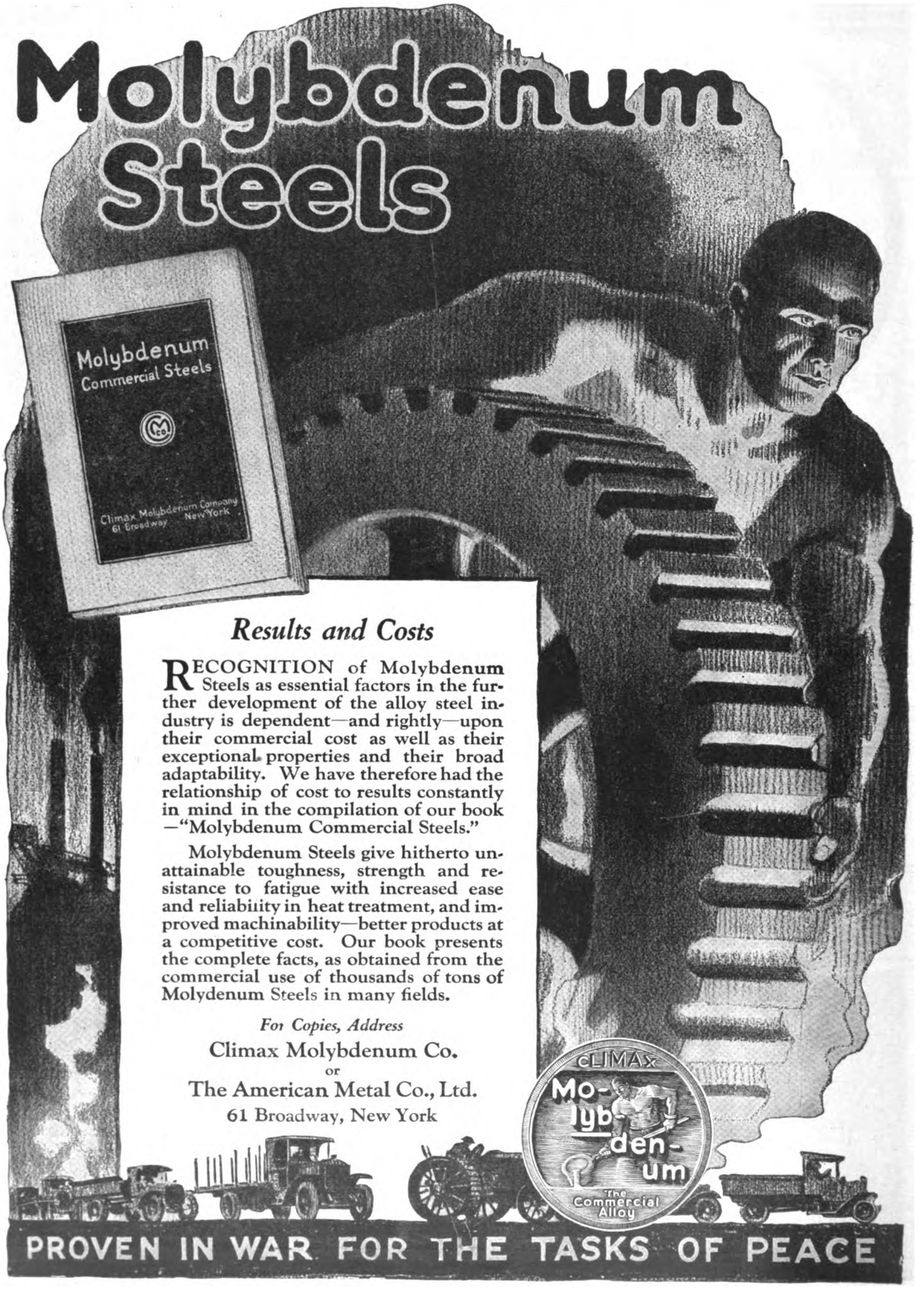
Molybdenum Steels



Results and Costs

RECOGNITION of Molybdenum Steels as essential factors in the further development of the alloy steel industry is dependent—and rightly—upon their commercial cost as well as their exceptional properties and their broad adaptability. We have therefore had the relationship of cost to results constantly in mind in the compilation of our book —"Molybdenum Commercial Steels."

Molybdenum Steels give hitherto unattainable toughness, strength and resistance to fatigue with increased ease and reliability in heat treatment, and improved machinability—better products at a competitive cost. Our book presents the complete facts, as obtained from the commercial use of thousands of tons of Molydenum Steels in many fields.

For Copies, Address

Climax Molybdenum Co.
or
The American Metal Co., Ltd.
61 Broadway, New York

CLIMAX Mo-lyb-den-um The Commercial Alloy

PROVEN IN WAR FOR THE TASKS OF PEACE

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Wilson dependable MOTOR TRUCKS

IT IS not alone for their rugged strength and their get-there-and-back ability that great corporations continuously purchase Wilson trucks.

Big business looks also to mature age—to that ripened experience which bespeaks a worthy and dependable product.

And in their purchases of Wilson trucks you will find that the United States Government, and scores of industrial concerns like Standard Oil, the United States Cartridge Company, the Coffin Packing and Provision Company, the Armstrong Transfer Company, the Postal Telegraph Company, have been influenced, in a very large degree, by the fact that Wilson trucks have now been built for eight years; and that back of all this are still twenty-nine additional years of commercial vehicle manufacture —an honorable record covering *thirty-seven* years in all.

Send for Our Free Book
"Money in Motor Trucks"

1½—2½—3½—5 Ton—All Worm Drive

J. C. WILSON COMPANY, DETROIT, U. S. A.

London *Export Office:* 100 Broad Street, New York

Digitized by Google

Road Builders Meet Haulage Demands They Use United States Motor Trucks

Right now! This spring! Roadbuilders and contractors face schedules that will tax their resources and ingenuity as never before, Owing to present high costs for labor and materials, haulage will determine their success or failure. Speed with dependability is the needed factor. That is supplied by United States Motor Trucks.

Special features make United States Motor Trucks "fool proof" and adaptable to any class of work on any going surface. The complete United States Motor Truck line —worm drive—5 capacities—1½ to 6 tons.

This line is two years ahead in engineering design, construction, materials, and refinement of detail. Not limited to road builders and contractors—Meets requirements of any business — hauls anything with equal economy and dispatch.

The exclusive feature, "Floating Power Plant", gives full power on any road, good or bad, hilly or level. Strains, twists, or jolts do not stall the motor, bind the bearings or lessen the power.

DEALERS—are you wide awake to motor truck opportunity at your door? Looking to the future? Get our proposition. It is the most attractive ever offered.

For particulars address, Mr. W. R. Kyle, Care of

THE UNITED STATES MOTOR TRUCK CO,, Cincinnati, O.
INCORPORATED

United States Motor Trucks

FLOATING POWER PLANT

Please mention "Power Wagon" when writing to advertisers.

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Universal

Steel Cushioned Wheels **HUB ESS** **FULL FLOATING** **Mead Cushioned Wheels**

TRUCK WHEELS

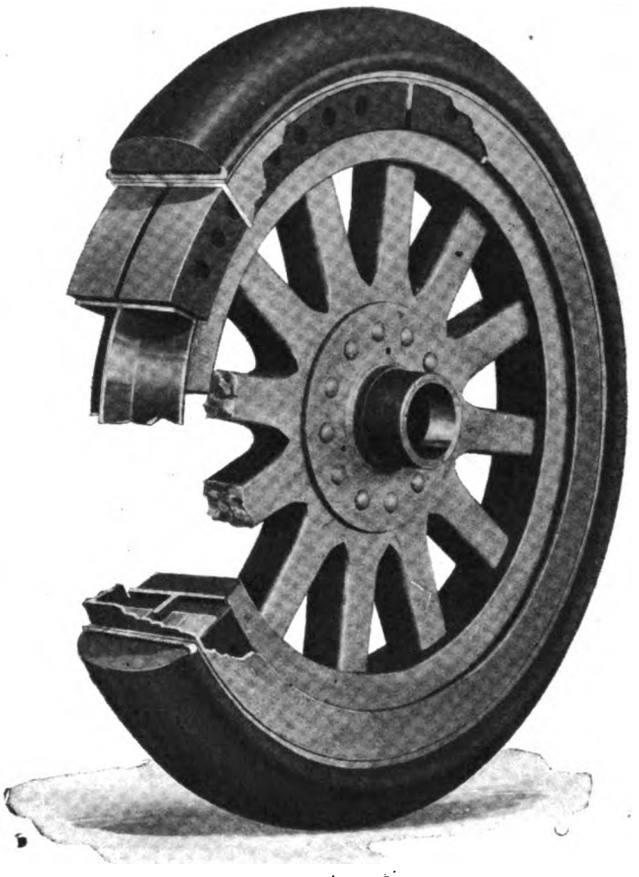
A Practical Wheel for Trucks, Tractors and Trailers

Simple in Construction

Mechanically Correct in Construction

Vibrations and Hammer Thrusts from Road Contact are Absorbed in the Wheel

The Wheel Designed with a Knowledge of Traffic Conditions



This Wheel Excels in Resiliency, Efficiency, Durability and Economy.

Reduces Gasoline Expense 25%

Reduces General Upkeep Expense More than 50%

Protects the Engine and Chassis against Crystallization

A Practical Wheel for Any Truck on Any Road with Any Load

This Wheel Meets the Growing Demand of Truck Users for Reducing Upkeep, and for Protection from Engine, Tire and Chassis Troubles.

A Wheel With Perfect Drawbar Pull

This Wheel Rides with the Resiliency of Pneumatic Tires and is not injured by Oils, Acids, Salts or Other Chemicals, because the Rubber is fully protected.

Initial Investment Compensated by Reduced Aftercost Plus Upkeep

PITTSBURGH TRUCK WHEEL CORPORATION
General Offices: 624 Bessemer Building
PITTSBURGH, PA.

Please mention "Power Wagon" when writing to advertisers.

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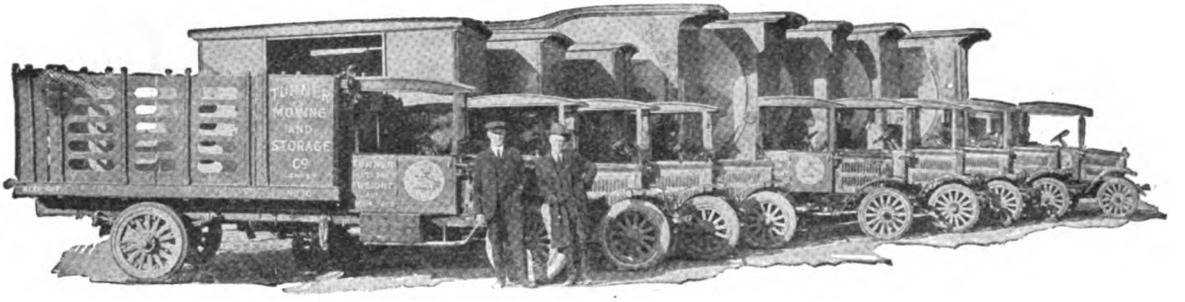


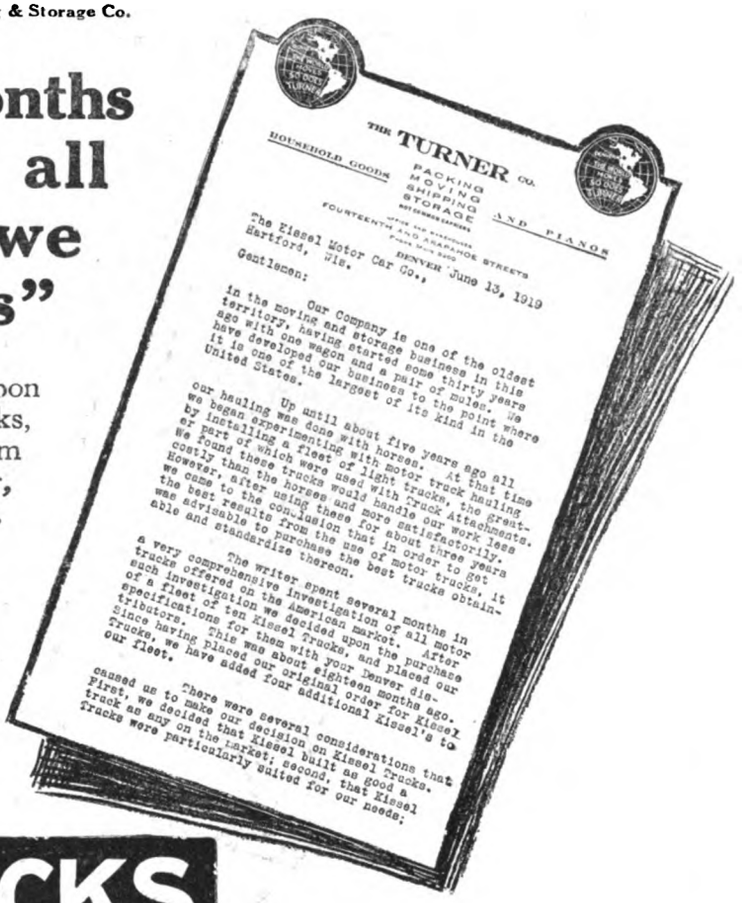
Part of Kissel fleet owned by Turner Moving & Storage Co.

"After several months investigation of all motor trucks—we purchased Kissels"

"After this investigation we decided upon the purchase of a fleet of ten Kissel Trucks, and placed our specifications for them with your distributor," adds Mr. Turner, President, Turner Moving & Storage Co.

"This was about eighteen months ago. Since then we have added about four additional Kissels to our fleet."

What the Turner investigation brought to light—why he invested in Kissel Trucks—are facts you, no matter what business you are in, will find very interesting. They are told in the—



THE TURNER CO.
HOUSEHOLD GOODS PACKING MOVING SHIPPING STORAGE AND PIANOS
FOURTEENTH AND ARAPAHOE STREETS
DENVER June 13, 1919

The Kissel Motor Car Co.,
Hartford, Wis.

Gentlemen:

Our Company is one of the oldest in the moving and storage business in this territory, having started some thirty years ago with one wagon and a pair of mules. We have developed our business to the point where it is one of the largest of its kind in the United States.

Up until about five years ago all our hauling was done with horses. At that time we began experimenting with motor trucks, by installing a fleet of light motor truck hauling equipment which were used with trucks, the greater part of which were used with trucks, the greater We found these trucks would handle our work less costly than the horses and more satisfactorily. However, after using these for about three years we came to the conclusion that in order to get the best results from the use of motor trucks, it was advisable to purchase the best trucks obtainable and standardize thereon.

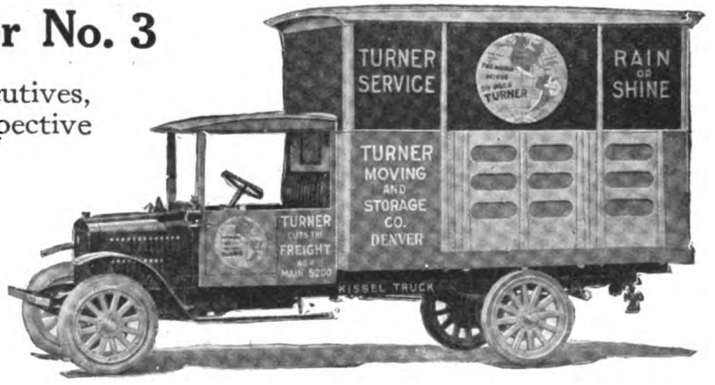
The writer spent several months in a very comprehensive investigation of all motor trucks offered on the American market. After such investigation we decided upon the purchase of a fleet of ten Kissel Trucks, and placed our specifications for them with your Denver distributors. This was about eighteen months ago. Since having placed our original order for Kissel Trucks, we have added four additional Kissel's to our fleet.

There were several considerations that caused us to make our decision on Kissel Trucks. First, we decided that Kissel built as good a truck as any on the market; second, that Kissel trucks were particularly suited for our needs;

KISSEL TRUCKS

Performance Proof Folder No. 3

Send for it—it's free to business executives, purchasing managers, present or prospective truck owners, who write on their business letterhead. In addition we will send you other Kissel Truck Performance folders containing facts, and statements by owners of Kissel Trucks in all parts of the country and in different lines of business.



Kissel Motor Car Co., *Hartford, Wis., U.S.A.*

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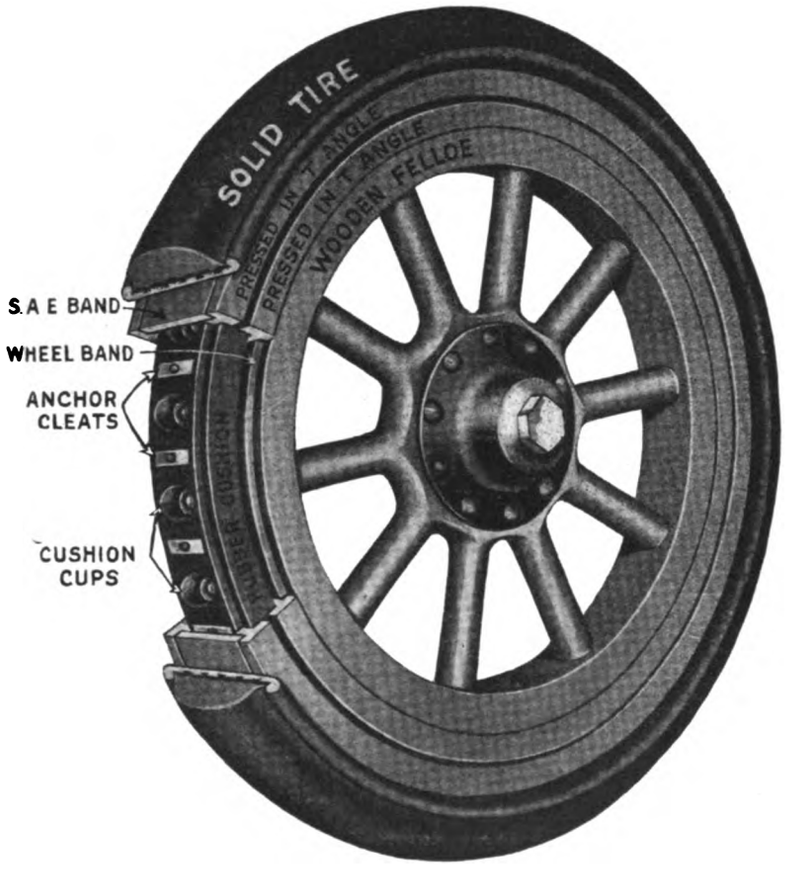
MARTIN
CUSHION WHEELS
for Motor Trucks

No bolts
No nuts
Pressed on
Throughout
Light
Strong
Resilient
Durable



Backed
by
Nine Years'
Experience
in Building
Good
Cushion
Wheels

Adopted for Standard Equipment on
"OLD RELIABLE" MOTOR TRUCKS
1½ to 7 Ton

MARTIN CUSHION WHEEL CO.
311-13 N. Sangamon St. **CHICAGO, ILLINOIS**

Branches and Service Stations in All Principal Cities

QUOTATIONS SENT UPON REQUEST

Please mention "Power Wagon" when writing to advertisers.

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HIGHWAY TRAILER

EDGERTON WISCONSIN

Sell the Trailer That Sells a Fleet

Costs $200 to $300 Less Than Other Trailers. Note the Nationally Important Business Concerns That Choose Highway Trailers

The sale of a Highway Trailer nearly always means repeat orders.

The fleets now operated by these nationally known business concerns (listed below) started with a single Highway Trailer.

The efficiency and economy of that first unit sold the rest of the fleet. That is the most profitable kind of salesmanship to Highway Trailer dealers.

The Highway Trailer is the most highly endorsed Trailer in the market. It is not only the choice of the largest transportation managers in America, but it was exclusively accepted without design modification, by the United States government, now operating more than $1,000,000 worth.

If you are interested in a franchise, write or wire.

Note Price Advantage of Highway Trailers

1½ Ton $725	2½ Ton $935	4 Ton $1225	6 Ton $1545

These Are a Few Truck Operators Using Fleets of Highway Trailers

U. S. Army, U. S. Navy

"Piggly Wiggly" Chain Stores
Headquarters, Chicago, Ill.

The National Tea Company

The Consumers Refining Co.
Chicago, Ill.

The Cadillac Motor Car Co.
Detroit, Mich.

The Timken-Detroit Axle Co.
Detroit, Mich.

The Sterling Motor Truck Co.
Milwaukee, Wis.

The Manitowoc Ship Yards
Manitowoc, Wis.

Fairbanks-Morse Company
Beloit, Wis.

Southwestern Telephone & Telegraph Company
St. Louis, Mo.

Melchior, Armstrong & Dessau
Buenos Aires, Argentine
Montevideo, Uruguay
Barbados Islands

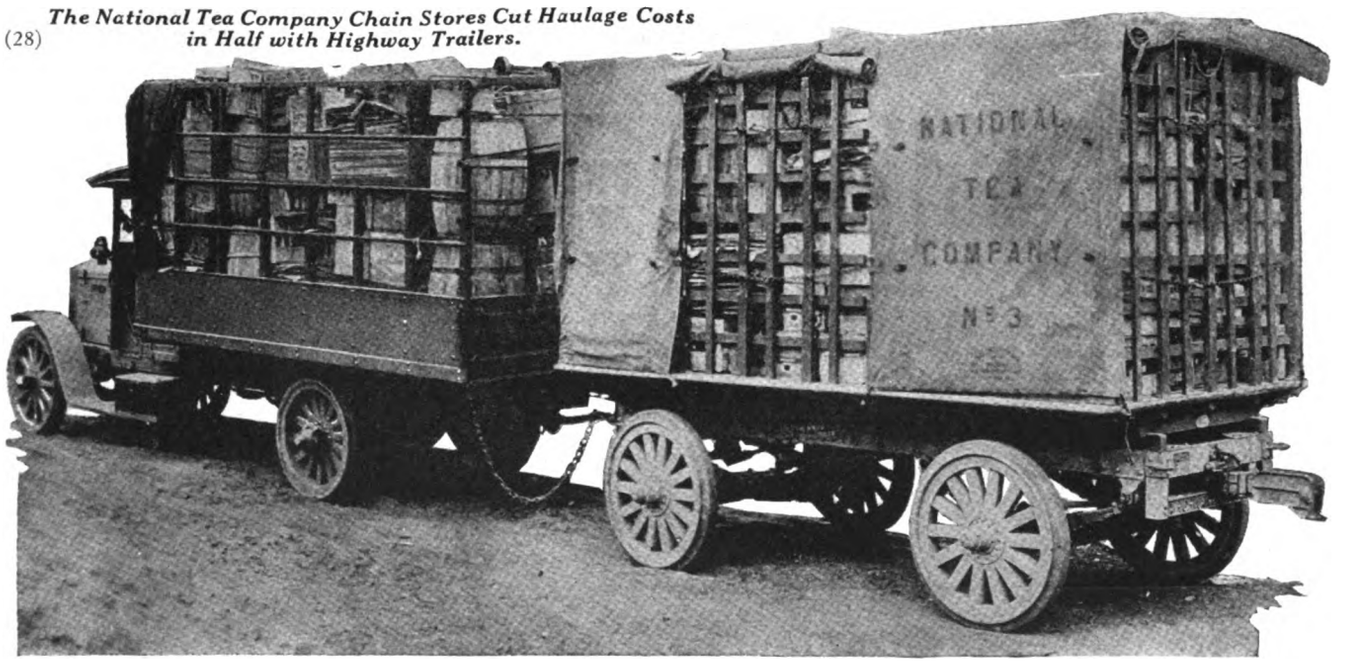
Towars Creamery Company
Detroit, Michigan

City of Washington, D. C.

One-Wheel Truck Company
St. Louis, Mo.

The National Tea Company Chain Stores Cut Haulage Costs in Half with Highway Trailers.

(28)



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Stewart

Magnetic Type SPEEDOMETER

For Motor Trucks

Are You an Investor or a Speculator?

A FIXED income from your trucks can only be ascertained by determining the cost per mile. Do you want an unbroken series of cost records covering a long enough period of time to make them instant and trustworthy guides?

Would you bring to light the operating economics of one driver and the profit-eating carelessness of another?

Would you prove the qualities and brands of fuel, oil and tires?

Which is the cheapest and shortest route for delivery over a given territory?

Are you certain that your trucks are being operated at a minimum cost?

A Stewart Speedometer Will Tell You

To be operated most economically and profitably, every motor truck should be equipped with a Stewart Speedometer. It will answer all the above questions, and more. Will quickly pay for itself by reducing expenses.

Our special Truck Model was designed during the war for the U. S. Government. It will, therefore, stand up and render continuous service under the hardest usage.

Every truck should also have a Stewart Vacuum Gasoline System, a Stewart Warning Signal and be equipped with two Stewart Searchlights. Progressive truck and accessory dealers carry all these products as part of their regular stock.

Model 131 M

$35

Stewart-Warner Speedometer Corporation

C H I C A G O, U. S. A.

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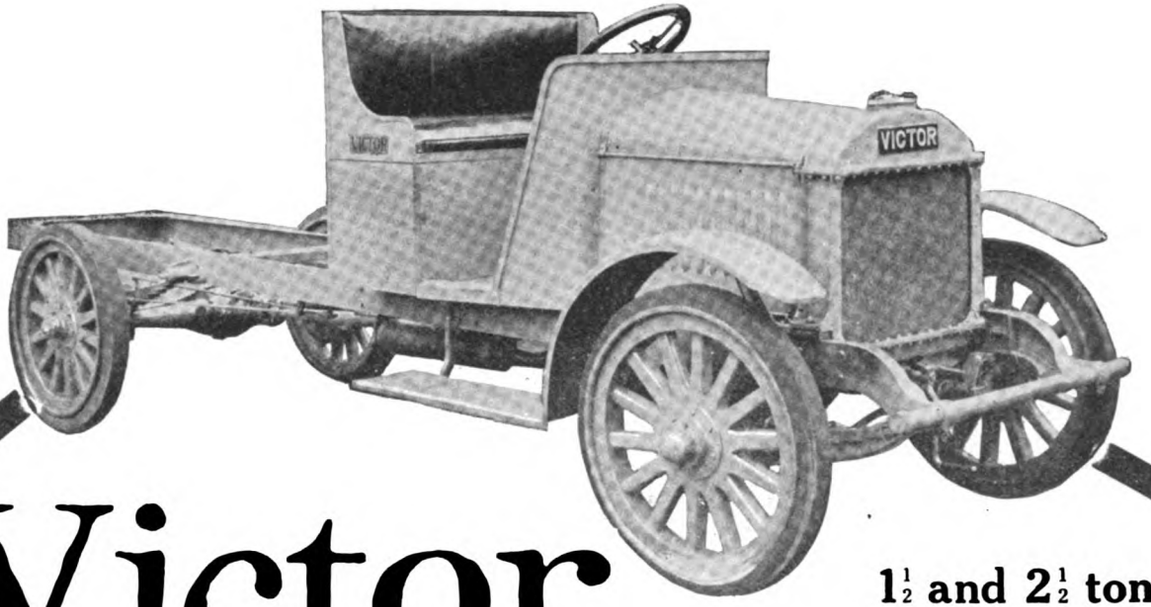

Victor

1½ and 2½ tons

The Victor worm drive motor truck is designed to stand rough usage and to give long and continuous service. That it is doing this is evidenced by repeat orders and its large number of satisfied users.

Victor dealers have the satisfaction of knowing that the Victor will make good on every claim that is made for it.

Your territory may still be open.

Write for particulars.

Victor Truck Company

St. Joseph Michigan

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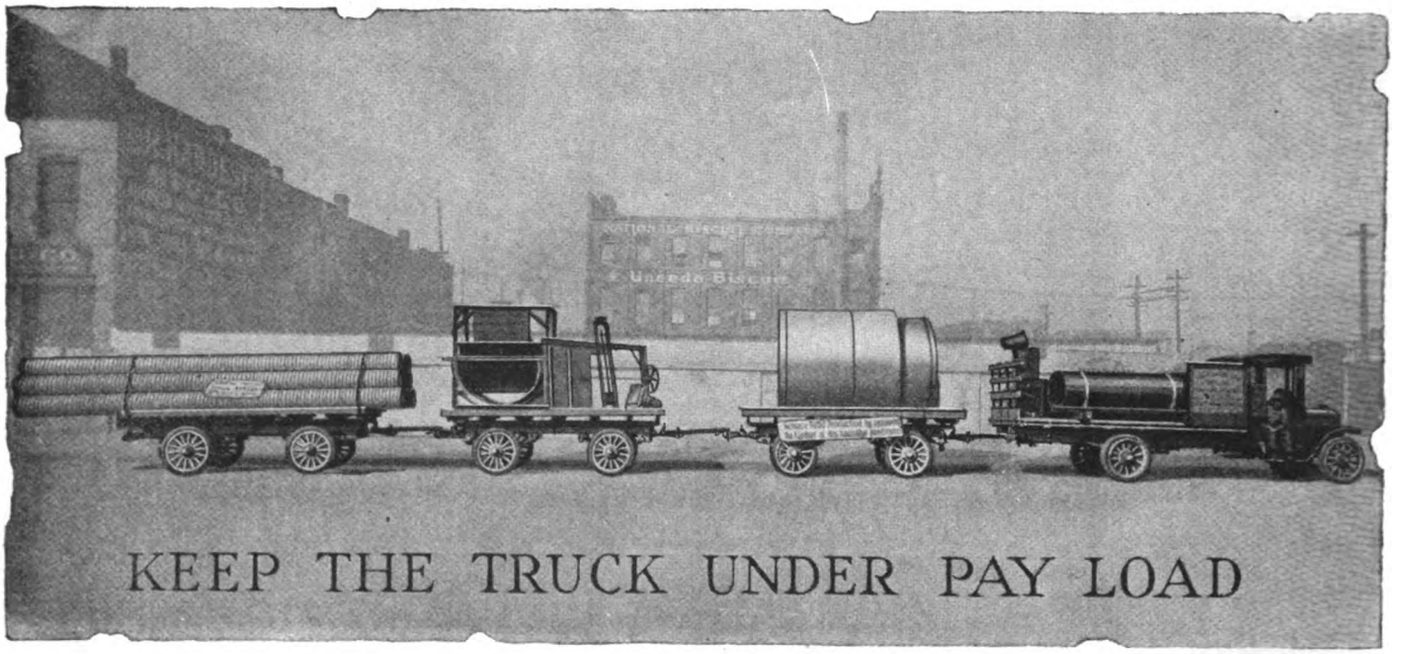
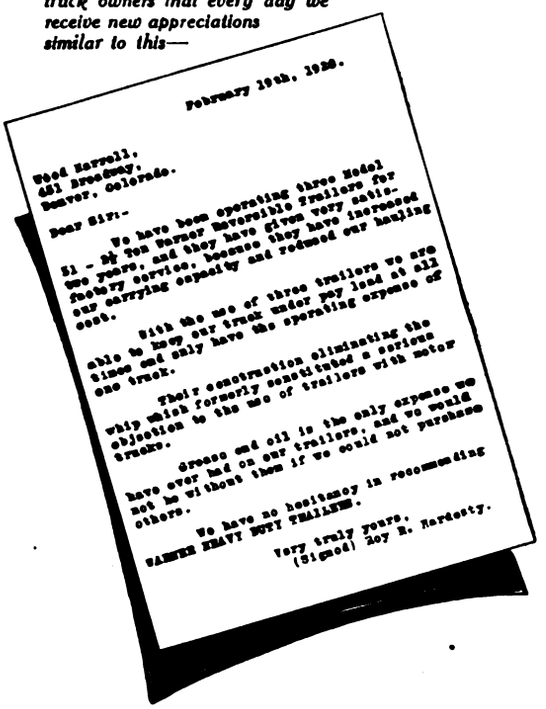


Warner Trailers are increasing hauling efficiency for so many truck owners that every day we receive new appreciations similar to this—



February 19th, 1920.

Wood Harrell,
451 Broadway,
Denver, Colorado.

Dear Sirs:-

We have been operating three Model 51 - 2½ Ton Warner Reversible Trailers for two years, and they have given very satisfactory service, because they have increased our carrying capacity and reduced our hauling costs.

With the use of three trailers we are able to keep our truck under pay load at all times and only have the operating expense of one truck.

Their construction eliminating the whip which formerly necessitated a serious objection to the use of trailers with motor trucks.

Grease and oil is the only expense we have ever had on our trailers, and we could not be without them if we could not purchase others.

We have no hesitancy in recommending WARNER HEAVY DUTY TRAILERS.

Very truly yours,
(Signed) Jay R. Hartsell.

NO matter what your hauling problem, no matter what trucks or loads, there is a Warner Trailer to help you "Keep the Truck Under Pay Load" by multiplying the efficiency of your trucks—doing *more* work with *less* labor, at *lower* cost.

Each Warner Trailer is as strongly and scientifically built as a high grade motor truck.

The full Warner line includes Two Wheel, Four Wheel, Semi-Trailers and Auto Trailers. There is a type and a size for every hauling purpose.

Write us about your situation. Our engineers will be glad to help you. Illustrated descriptive literature free.

WARNER MANUFACTURING CO.
26 Main Street, Beloit, Wisconsin

WARNER
HEAVY DUTY
TRUCK TRAILERS
TWO AND FOUR WHEEL TYPES

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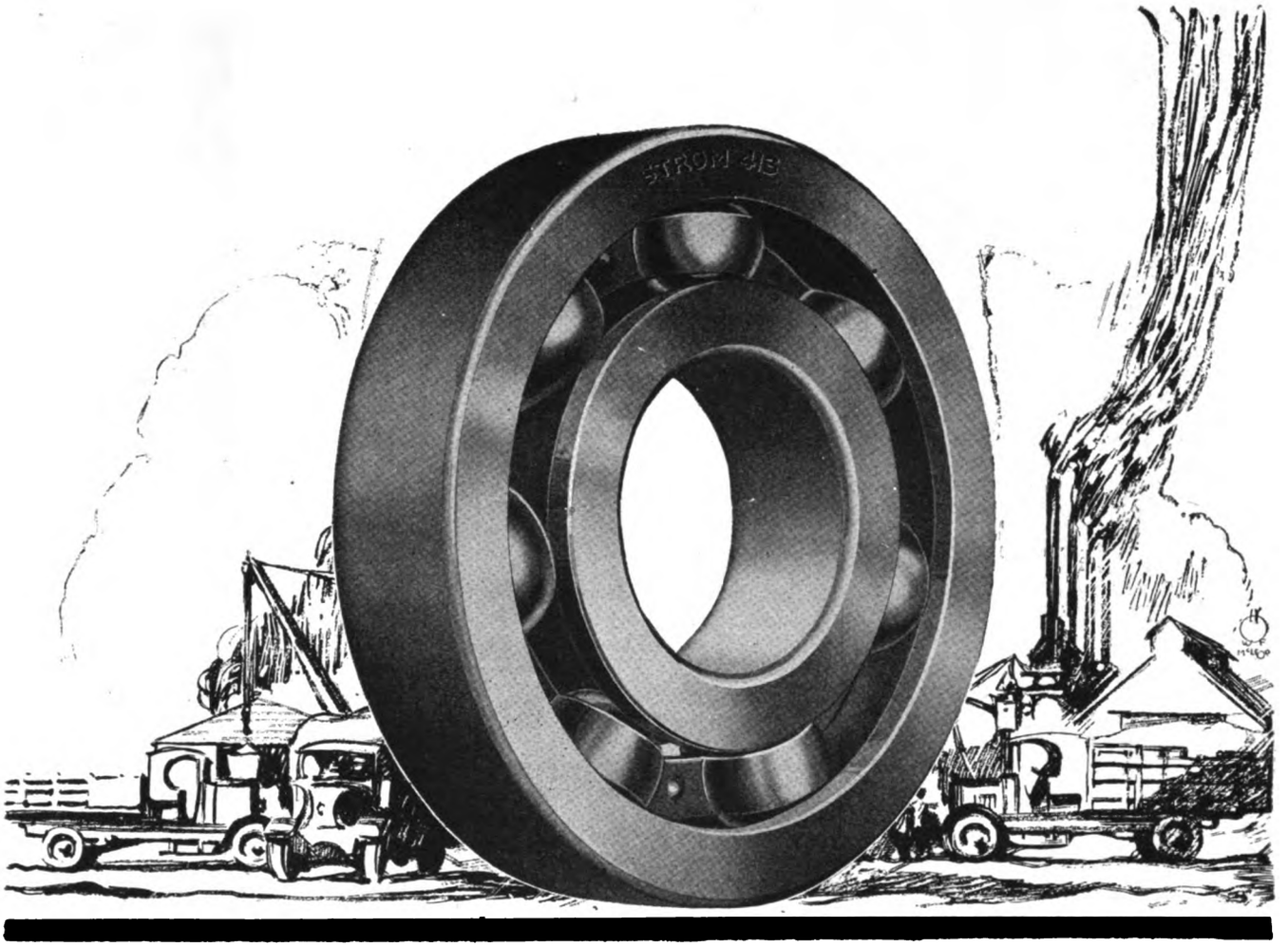

Strom Bearings Give the Motor Truck Longer Life

Strom bearings in motor trucks reduce friction and so prevent unnecessary strain on the truck parts. The Strom equipped truck hauls heavier loads with less effort.

Right in design, Strom bearings are made from best materials. Heat treated by the most modern and approved methods, they prove their quality by the high character of their performance.

Wherever a shaft turns Strom bearings can be used most economically. Once installed, they require little attention. They multiply power by reducing power-destroying friction.

Installation of bearings is a specialized engineering problem. If you have a bearing problem to solve, Strom experts are at your service.

U. S. BALL BEARING MFG. CO.
(Conrad Patent Licensee)
4535 Palmer St., Chicago, Ill.

Strom BEARINGS

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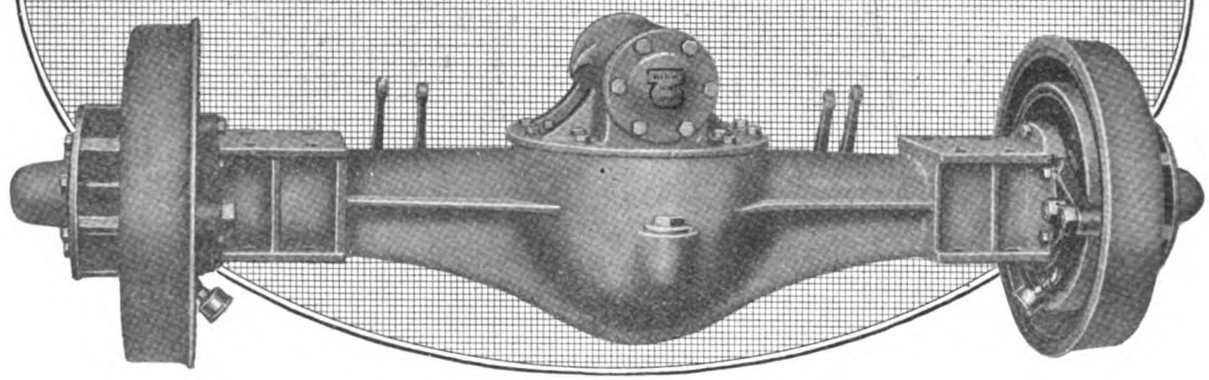
WISCONSIN AXLES



The Housing of Wisconsin Axles Has Never Broken Down in Service

The backbone of the Wisconsin Worm-Drive Axle is a single piece housing extending from wheel to wheel.

This housing encloses all driving parts maintaining them rigidly in perfect alignment, protecting them from injury, and providing a leak-proof reservoir for lubricants.

This housing has never been known to break in service. Pressed steel, forging or casting cannot be lighter without sacrificing strength or the necessary perfect alignment.

Because of these features Wisconsin Axles are specified as standard equipment on many of America's highest priced trucks.

WISCONSIN PARTS CO.

OSHKOSH, WISCONSIN

(1)

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ECONOMY

In Motor Truck Transportation Means

TRAILERS

Automotive Trailers are built to deliver **"Service."** We ask and expect your business on the basis of the Service they will give in constant use. Our line consists of a size and type for every trade.

"THE FREIGHT CAR OF THE HIGHWAY"

will reduce hauling costs.

Write for full information and prices. Tell us how we can best co-operate to your mutual advantage.

Automotive Trailer Corporation

1442 McCormick Building

CHICAGO

***Factory:* Kincaid, Illinois**

Please mention "Power Wagon" when writing to advertisers.

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EMPRESS
Grease and Oil Cups

STANDARD LUBRICATOR EQUIPMENT for the MOTOR TRUCK. ALWAYS RELIABLE.

Carefully made from the best grade of rolled sheet metal and solid rod stock by skilled workmen, accurately threaded, well finished and rigidly inspected, they provide a better and more effective lubricator.

Designed to meet the requirements of motor truck service; the wide range of types offers, in each case, a cup well suited to every phase of truck lubrication.

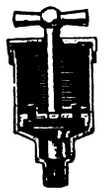
Here are a few types which are to be recommended for motor truck lubrication. All are being extensively used.

WRITE FOR CATALOG R---TO-DAY

It shows many other styles equally good.

No. 207

A plain exterior cup with leather packing. The packing acts as a stop preventing loss of cap, also leakage of grease.



No. 214

This cup actually provides a grease gun for every bearing. Capacity for 15 to 35 greasings without refilling. Send for special folder.

No. 249

A plain cup with effective internal lock. Not affected by vibration. A very satisfactory general purpose grease cup.

No. 116

Strong, well made hinge lid oiler. Designed for use on spring shackle bolts. Self closing and dust-proof.

No. 5739

Reliable and effective reservoir cup. Cannot leak. Used extensively on steering spindles. Absolutely dust proof.

No. 53

Can be used in a vertical, oblique or horizontal position. Also made in self-closing type, No. 70.

BOWEN PRODUCTS CORP.

Manufacturing and Sales Divisions
AUBURN DIV., AUBURN, N.Y. MINNEAPOLIS DIV., MINNEAPOLIS, MINN.
WINKLEY DIV., DETROIT, MICH. ZERK DIV., CLEVELAND, OHIO

Canadian Factory
CANADIAN WINKLEY CO., LTD, WINDSOR, ONT.

Branch Sales Offices
NEW YORK, 220 BROADWAY
CHICAGO, 1607 OTIS BUILDING
BOSTON, 253-255 FRANKLIN STREET
CINCINNATI, 409 LYRIC BUILDING
SAN FRANCISCO, MONADNOCK, BUILDING

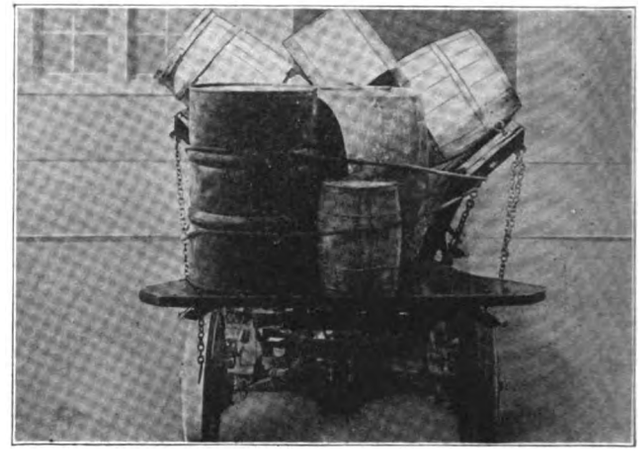
REG. U. S. PAT. OFF.

Emblem

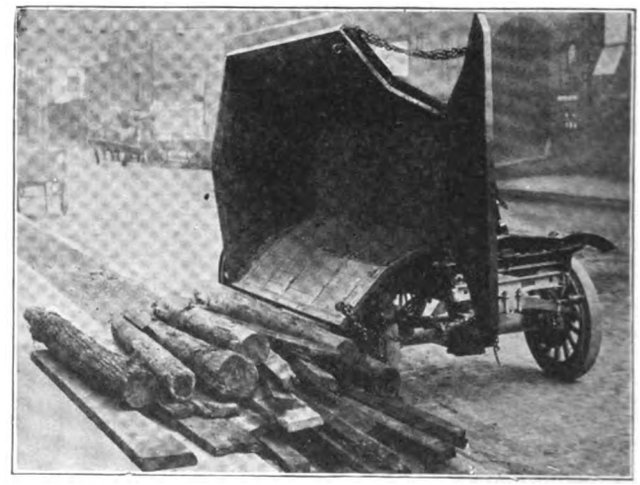
LEE LINE

Trailers—Bodies—Loaders

Express Type Side Dump Body



Most people think of "loose material" as a product of pit, mine or quarry, i. e. gravel, crushed stone, ore, coal, etc. Used in connection with Lee Dump Bodies, the term takes a wider significance and embraces rough lumber, lath, brick, bag cement, grain, loose and in bags, sugar beets, sugar cane, cotton and hundreds of other products hauled by motor trucks.



Conserve the truck's valuable time by dumping instead of unloading by hand whenever possible. Save from twenty minutes to two hours each trip.

Lee "Express Type" Side Dump bodies operate the same as the "Standard" Side Dump, but have an end gate useful when non-dumpable merchandise is carried.

If it is a Trailer, Semi-Trailer, Motor Truck or Trailer Body or special handling or hauling equipment—we make it.

LEE LOADER & EDDY CO.

Builders of Automotive Auxiliary Equipment

2340 So. La Salle St. Chicago

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Lubricates from HUB to HUB

Oil flows from one end of the axle to the other, lubricating all working parts.

All gears are completely housed and run in an oil bath.

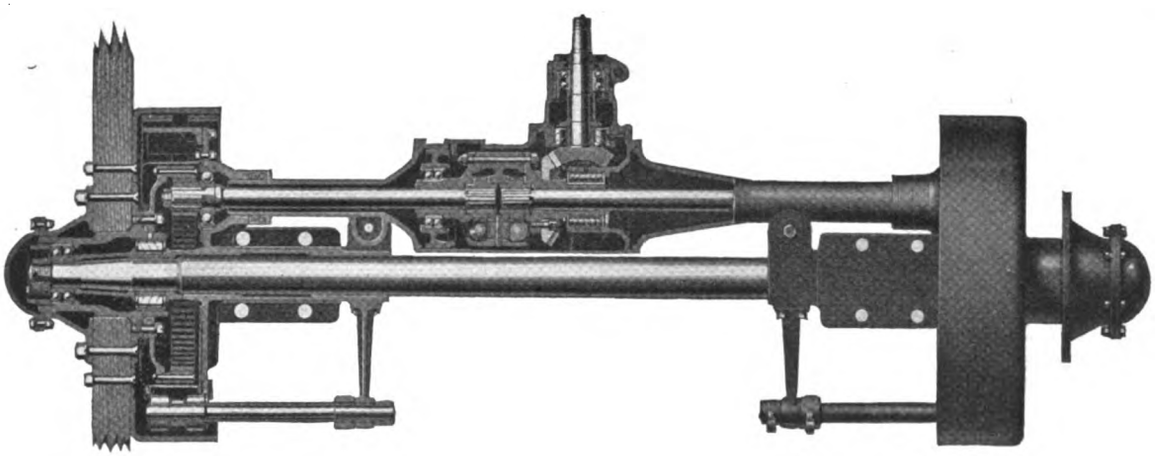
Kennedy INTERNAL GEAR axles

"The most perfectly lubricated internal gear axle in the world."

THE Kennedy axle exemplifies all of the advantages of the internal gear principle with added superiorities.

In design, quality of materials, and workmanship, the Kennedy not only is the leader of its field, but attains supremacy in rear axle construction for motor trucks.

Back of every Kennedy axle stands a good-will accrued during thirty-seven years of manufacturing quality products.



Descriptive Literature Will Be Mailed on Request

THE HERO MANUFACTURING CO.

Incorporated 1883

PHILADELPHIA, PA.

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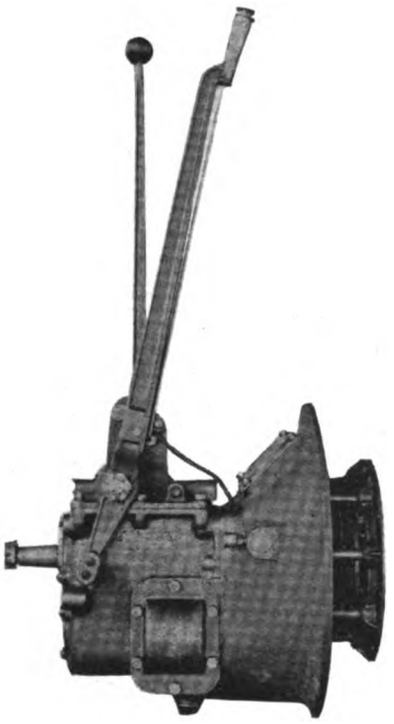


FULLER TRANSMISSIONS

Fuller Transmissions are designed for modern motor trucks. Note the plate on the side which may be removed and a Fuller Power Take Off attached or a tire pump.

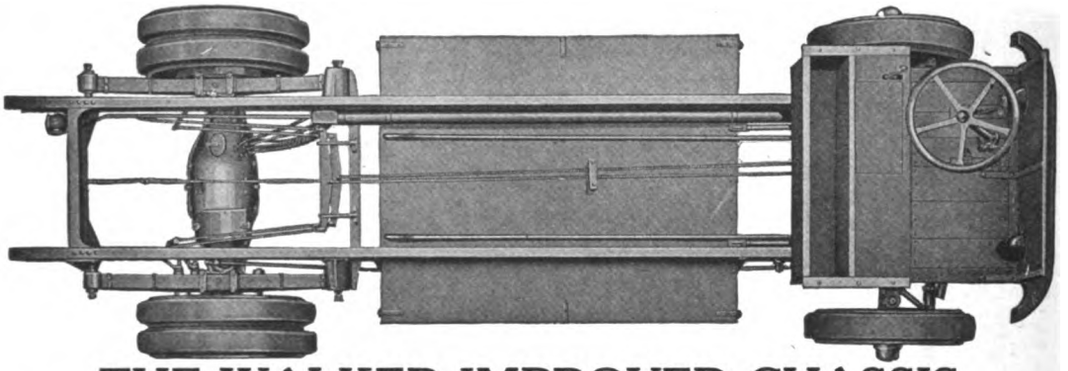
The low gear ratio 4-1 specially for pneumatic tired trucks.

The entire plant is devoted to manufacturing transmissions.

FULLER & SONS MFG. CO.
Kalamazoo, Mich.

Detroit Office, Kresge Bldg.
New York Office, American Circle Bldg.
San Francisco Office, Rialto Bldg.

WALKER ELECTRIC TRUCKS



THE WALKER IMPROVED CHASSIS

THE UTMOST IN *SIMPLICITY*—ONE THOUSAND FEWER PARTS THAN ANY GASOLINE CHASSIS
WALKER ELECTRIC CHASSIS ARE OPERATING *PROFITABLY* IN ALL INDUSTRIES.

ASK ANY WALKER USER, BRANCH OR DEALER

WALKER VEHICLE COMPANY
America's Leading Manufacturer of Electric Trucks and Tractors
NEW YORK CHICAGO BOSTON

LOWEST-TRUCKING-COST

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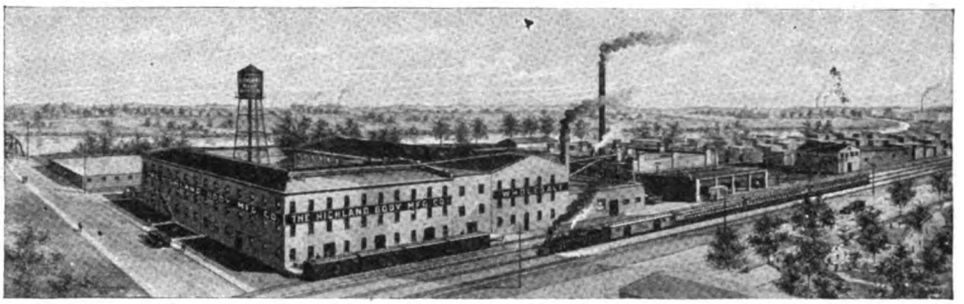
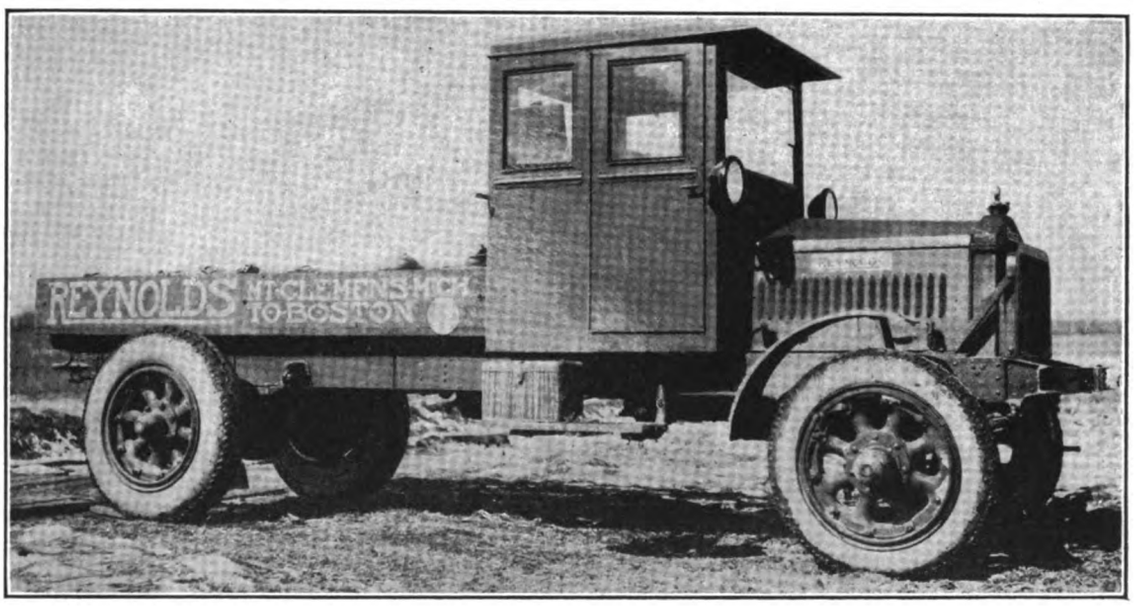
HIGHLAND STANDARD BODIES AND CABS



THE HIGHLAND BODY MFG., CO.

CINCINNATI **OHIO**



Reynolds Distributors are securing a remarkable volume of business not alone due to the unequaled quality product but also to the fact that each size chassis is completely equipped in every detail.

Reynolds Motor Truck Company

Mt. Clemens, Michigan

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Speaking of CONCRETE GARAGES

Is your car protected in a weatherproof, fireproof, permanent garage? Is your other property protected because your car is thus housed?

You want a garage like that—one that is reasonable in cost and requires practically no repairs.

You can have it if you use Concrete in any one of several ways. You'll be interested in knowing how a concrete block garage will meet your needs.

Ask for our free booklet "Concrete Block Garages"

PORTLAND CEMENT ASSOCIATION

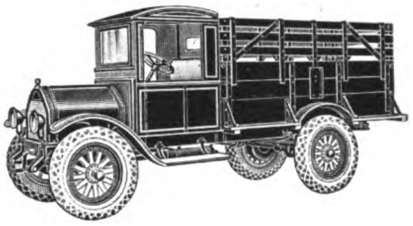
Atlanta, Chicago, Dallas, Denver, Des Moines, Detroit, Helena, Indianapolis, Kansas City, Los Angeles, Milwaukee, Minneapolis, New York, Parkersburg, Pittsburgh, Portland, Oreg., Salt Lake City, San Francisco, Seattle, St. Louis, Washington

The Luverne Farm Truck

Capacity Two Tons

PRICE $1800.00

Including Electric Starter and Lights, Semi-Enclosed Cab and Combination Grain and Stock Body



These trucks have been on the market for over three years, during which they have fully proven their ability to meet the requirements of the **Farm Trade** in a superior manner.

Ask for our Dealers' Proposition

LUVERNE MOTOR TRUCK COMPANY

LUVERNE MINNESOTA

Wood Hydraulic Hoist & Body Co.

Manufacturer of

{Wood Detroit} Hydraulic Hoists

and

Steel Dumping Bodies

CHICAGO 2911 Indiana Ave.

DETROIT 1026 Bellevue Ave. *(Factory)*

NEW YORK 721 E. 135th St.

SAN FRANCISCO 441 Folsom St.

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Cut Out the Waste!

WASTE of Lubricating oil is reduced to a minimum by the BOWSER portable oil measuring tank.

Loss of the lubricating value of oil is prevented by keeping it pure and clean.

The power of the motor is conserved.

The life of the motor is prolonged and haulage costs are reduced.

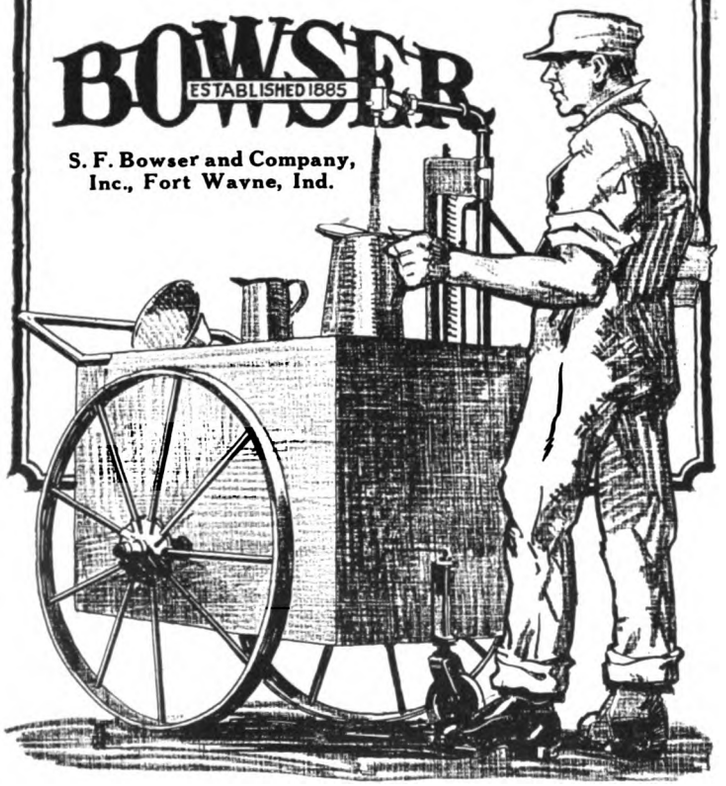
Operating economy is directly dependent upon the use of motor oils of known lubricating value, protected against the introduction of foreign matter and supplied in exact quantity.

Such service is possible with a BOWSER.

We Will Gladly Recommend the Units Most Economical for Your Use.

BOWSER ESTABLISHED 1885

S. F. Bowser and Company, Inc., Fort Wayne, Ind.



The excellence of Wolverine Trucks makes it possible for us to offer dealers a generous factory guarantee

Detroit, Mich., Nov. 15, 1919.
AMERICAN COMMERCIAL CAR CO.,
Detroit, Michigan

Gentlemen:—Your recent inquiry as to how we like the Wolverine Truck, should have received its answer from the fact that we purchased two of them this year. We surely would not have acquired the second if the first had failed to stand the gaff.

However, for your benefit, we will carry a little coal to Newcastle by stating that our two Wolverines are certainly holding up their end in demonstrating the three virtues that make a truck an invaluable aid in holding down existing high operative costs—efficiency, economy and dependency. In the expressive vernacular of the street, the Wolverine is unquestionably a peach.

CHAMPION BEVERAGE COMPANY,
F. Schmidt, Pres.

You have only to read what every operator of a "Wolverine" says to know that the standard units of which it is built are assembled into the finished truck in the most expert way.

Every truck that leaves our shipping dock is a perfect piece of rugged construction built to stand up under all conditions.

We have openings for a few progressive Distributors and Dealers.

If you are looking for a truck built of the best units of over-size strength that sells easily at a moderate price—and stays sold—you will be interested in getting Wolverine prices, discounts, terms and guarantee. If we are not represented in your territory write or wire us.

American Commercial Car Co.
DETROIT, MICHIGAN
February, 1920

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It's *Oversize* That Counts

After all, it is the *life* of a truck that counts—the many years of dependable day-after-day service.

STOUGHTON *Oversize* TRUCKS

are built for longer truck life. Extra strength of every part means greater reliability—more years of hard, daily work—lower upkeep costs.

Three models—1½, 2 and 3 ton sizes. Built by the manufacturers of the famous Stoughton Wagon—assurance of permanency and extra value.

We have an unusual dealer opportunity—If your territory is open write or wire today.

Stoughton Wagon Co.
Stoughton, Wisconsin

PNEUMATIC TRUCK TIRES

Write if Interested!

Splendid selection of factory-blemished and surplus stocks from the better Akron factories

The Rubber City Clearing House Co.
AKRON, O OHIO.

RADIATOR INSURANCE

GUARANTEED FOR THE LIFE OF THE TRUCK

These Seamless Helical Tube Cooling Sections are perpetual insurance against radiator trouble.

Write for complete information.

Rome-Turney Radiator Co.
Rome, New York, U. S. A.

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THE Sanford MOTOR TRUCK

Worm Drive

2½, 3½, 5 Tons

Experience Counts

Sanford Trucks

Model W-35, Capacity three and one-half tons. Bought by the Barrus Mill & Elevator Co., Fort Worth, Tex.

Dependability in the Sanford is the result of long experience knowing truck users' needs, the use of quality materials and workmanship, and the application of right manufacturing methods.

Experience counts with us as it does with users.

Sanford Motor Truck Co., Syracuse, N. Y.

PIERCE GOVERNORS

103

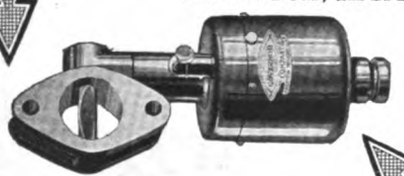
Motor Truck Manufacturers Now Furnish Pierce Governors as Standard Equipment

The overwhelming endorsement that the truck industry has given Pierce Governors proves conclusively two things:

—it proves that these manufacturers recognize the necessity of automatic speed control if their trucks are to deliver maximum service at minimum cost.

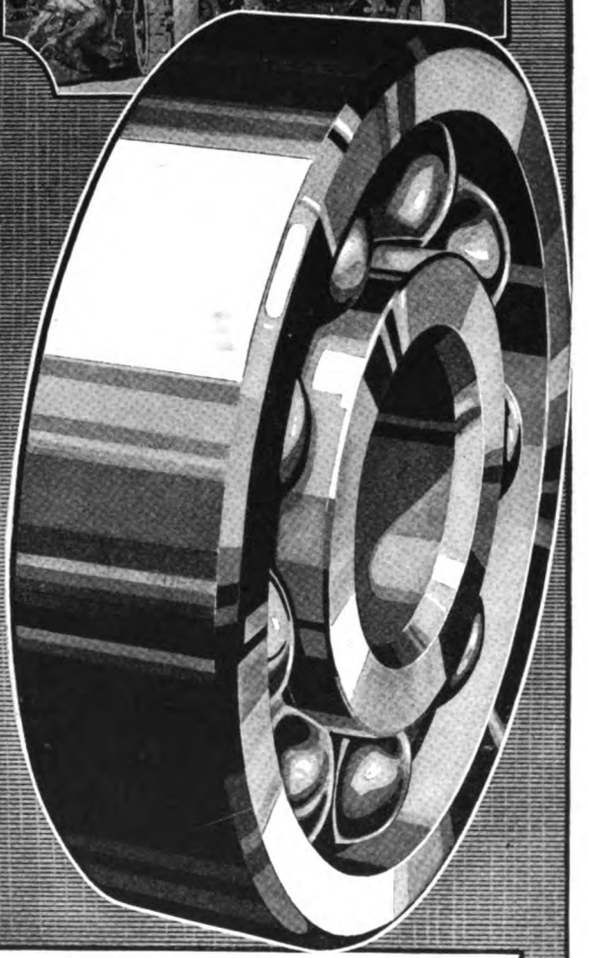
—and it proves beyond any question of a doubt the superiority of Pierce Governors over governors of other types.

The Pierce Governor Company
Anderson, Indiana



World's Largest Governor Builders

NEW DEPARTURE Ball Bearings



New Departure Ball Bearings are always stronger than the loads and shocks they have to withstand. This factor of safety insures continuous satisfactory service in your trucks.

THE NEW DEPARTURE MFG. CO., Bristol, Conn.
Detroit 523 Chicago

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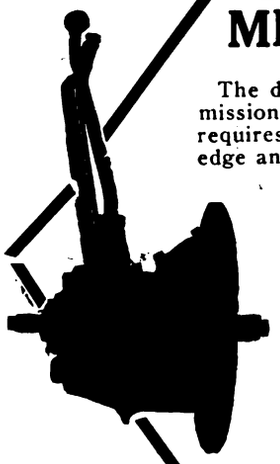
DURSTON

TRANS-MISSIONS



The designing of transmissions is an art that requires expert knowledge and long experience.

The building of transmissions calls for the best of materials and the most careful workmanship procurable.

DURSTON Transmissions fulfill every requirement—they have stood the supreme test of hard service for many years.

Durston Gear Corp.
32 Maltbie St.
Syracuse
N. Y.

Write for data on our new Unit Power Plant Transmission or 1½ and 3 ton trucks.

1½ Ton 2½ Ton 3½ Ton 5 Ton

Worm Drive Models

Write for complete information

SELDEN TRUCK CORPORATION
ROCHESTER, N. Y., U. S. A.

Selden Motor Trucks

GRAMM PIONEER BERNSTEIN

Gramm-Bernstein Trucks have an enviable name for economy.

Their cost of operation is exceptionally low. Their cost of upkeep is likewise low. Their life is so long that these costs, spread over a period of years, are reduced still further.

All Gramm-Bernstein worm-drive models carry, as standard equipment, accessories which are essential to the satisfactory operation of any truck, and which are worth $550 to $600 at today's prices.

The Gramm-Bernstein Motor Truck Co.
Lima, Ohio, U. S. A.
Builders of the First Liberty (U. S. A.) Truck

CELLULAR TYPES:
Wire Mercedes
Square Wireless
Diagonal Wireless

TUBULAR TYPES:
Square Fin
Round Fin

Send Us Your Blueprints and Specifications.

THE G & O MFG. CO.
New Haven, Conn.

G&O Radiator

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FOR giving maximum mileage and the greatest measure of protection to loaded trucks, Fisk Truck Tires are unsurpassed.

They save money for you.

FISK
TRUCK TIRES

48 of the First Fifty Pierce-Arrow trucks are still running after 8 years.

This extraordinary record is unique in motor truck experience. It can be duplicated by no other truck made.

Pierce Arrow
Trucks

deliver more work in a given time;
lose less time on the job and off the job;
cost less to operate and less to maintain;
last longer, depreciate less and command a higher resale price at all times.

The Pierce-Arrow Motor Car Company Buffalo N Y

Send for a copy of "The First Fifty"

The K. & L.
EFFICIENT and DURABLE
RADIATORS

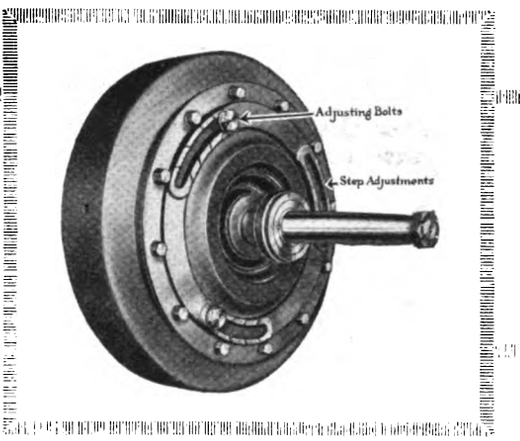
The ACE of Radiators

INVESTIGATE

Send for samples and report on preliminary tests—then send us your B-P's and engine data and let us prescribe for your particular wants and give you our quotations.

We manufacture all sizes and shapes of cores for all purposes. We also build all styles of complete radiators.

THE K. & L. RADIATOR MFG. CO.
CHICAGO, ILL.



The
"M&E" Dry Disc Clutch
(Patent Pending)

—i a sturdy unit that transmits the full power from the motor to the rear axle without the many disadvantages usually found in other clutches.

Let us know your requirements, and we will gladly demonstrate its adaptability to your layout.

MERCHANT & EVANS Co
NEW YORK PHILADELPHIA WHEELING
BALTIMORE CHICAGO
ATLANTA ST. LOUIS
CLEVELAND KANSAS CITY
LANCASTER DETROIT

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MUTUAL

"America's Greatest" TRUCK

attracted marked attention at the Chicago Truck Show

of the hundreds of trucks exhibited there, **not one** embodied as complete an array of **super-specifications** as were shown in the Mutual.

It was a matter of comment that the more truck-wise a visitor was, the longer he stayed at the Mutual exhibit, and the more thoroughly he posted-up on its every detail.

The Mutual Truck is built in 2 ton, 3 ton and 5 ton units, solid tires and 2½, 3½ and 6 ton pneumatics.

Send for our Folder

Mutual Truck Company

Sullivan - - - Indiana

U. S. A.

Discriminating Engineers

instantly recognize the marked superiority of our new Model B Universal Joint.

This Model B is the culmination of 15 years' concentration on universal joint construction by America's foremost automotive engineers.

Over-sized bearings, positively lubricated by oil distribution are incorporated in the many salient qualities built-into this new joint.

Unfailing service under full guarantee better tells the story.

A request brings complete information.

Blood Bros. Machine Co.

Pioneer Builders of Universal Joints

Allegan - - Michigan

DEALERS -- DEALERS

Get after the Side-Dump Body Business and increase the output of Trucks.

DUMPED
with an
AUTOMATIC SIDE-DUMP BODY

To increase the Sales of Trucks put on a Side Dump Body and Watch your Business Grow.

Dumps in any weather.
Will outwear any truck.
No lost space back driver's seat.
Can't break down and get out of order.
Dumps a 3 yard load in a minute and a half.
Dumps all the load off without operating Truck.

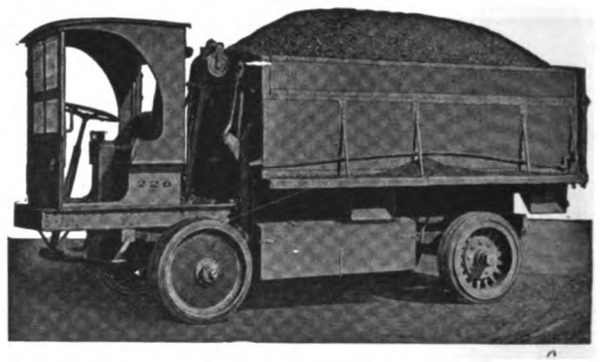
Fits Any Chassis

Write for attractive Dealers' Contract.

AUTOMATIC DUMP CAR COMPANY

Sales Dept. A

1701 Ernsperger Avenue, South Bend, Ind.



Front or Four-Wheel Drive Trucks and Tractors

Conservation is the key to success. ***Couple-Gear*** is the method, saves men and horses. Derives its propelling force from water flowage. The ***best*** is the ***cheapest.***

Your inquiries are solicited

Couple-Gear Freight-Wheel Co.

1550 Buchanan Ave., GRAND RAPIDS, MICH.

Couple-Gear Power Truck Co.
Peoples Gas Building, Chicago, Ill.

Couple-Gear Electric Truck Co.
179 W. First St., S. Boston, Mass.

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Winther Trucks

A complete line of quality trucks nationally known and appreciated.

Immediate Deliveries

Winther Motor Truck Co.
Kenosha, Wis.

Choosing Equipment for Motor Trucks

The Last Determining Factor in Selling

Dealers who sell Heil's Quality Bodies, Hoists and Tanks have a complete line of equipment for contractors, road makers, cartage, fuel and supply men, oil marketers and heavy trucking concerns.

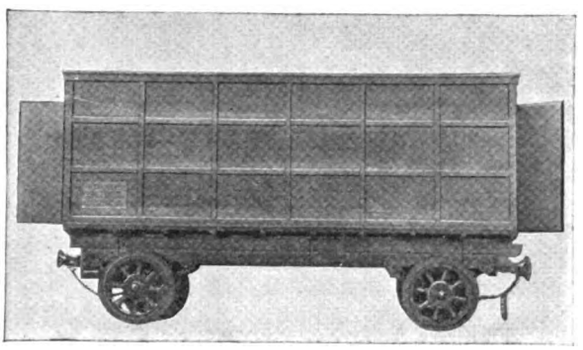
Selecting Heil Equipment as the Standard in your territory will prove a distinct advantage. There are many superior features found in the **Quality** Equipment.

—Tapered Dump Bodies—
—Combination Bodies for four kinds of work—
—The Hydro Hoist, eliminating many wearing parts—
—Electrically Welded Compartment Truck Tanks—

Write for literature on Heil Equipment

THE HEIL CO.

Offices 1140 Montana Ave., Milwaukee, Wisconsin
Chicago New York Detroit St. Paul Cleveland Dallas Memphis



ARCADIA TRAILERS

Four Wheels—1, 2, 3, 4, and 5 tons
Semi-Trailers—2, 4 and 6 tons
Log and Pole Trailers—2, 4 and 6 tons

You can no longer figure your customer's transportation problems without giving consideration to trailers. Arcadia Trailers are built to meet this need.

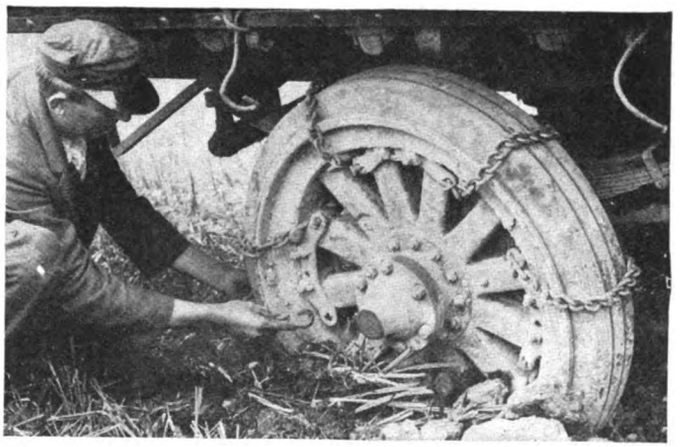
Are Your Customers Ready for Railroad Tieups?

DEALERS—Some good territory is ready for you. We have a "Trailer for every Trade" with bodies to fit, built under one roof. Write for "Trailerisms".

TRAILERIZE YOUR TRUCK WITH ARCADIA THE LEADING TRAILERS ARCADIA, NEW YORK STATE

Arcadia Trailer Corporation
23 Murray Street
Newark, New York State

Sole Foreign Sales Representative. Automotive Products Corp., Woolworth Bldg., New York



Keeps Trucks Moving Through All Kinds of Going

Giant Grip Traction Equipment soon pays its cost by eliminating delays due to bad roads.

Very easily applied—no jacking up necessary—the clamps are attached to the spokes permanently—the driver carries the chains in his tool box and hooks them on with his bare hands when the truck gets stalled. As easily detached after the truck is out of trouble.

There is a size Giant Grip for every truck (our No. 85 fits over 400 makes)—the dealer has only a few sizes to keep in stock. A small investment—quick turnover—and we stand squarely back of our guarantee of satisfaction.

Write for our proposition—ask for *Truck Time Insurance.*

GIANT GRIP MFG. CO. (*Established 1863*) Dept. 25, Oshkosh, Wis.
Formerly Named Challoner Company

Giant Grip

Traction Equipment for Motor Trucks

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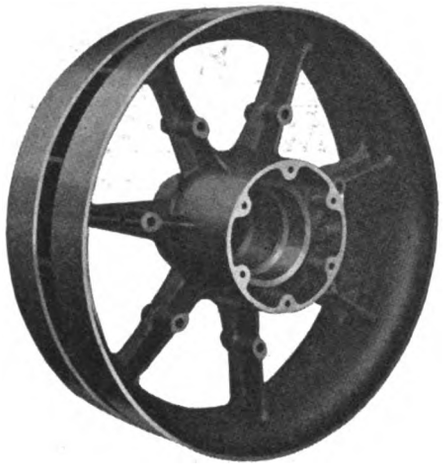
WEST
Cast Steel Wheels



Hubs Cast Integral
Any Make of Axle
Any Make of Tire

Specify West Cast Steel Wheels
On Your Next Truck Order

THE WEST STEEL CASTING CO.
Cleveland, Ohio

New York	Chicago	Detroit
1790 Broadway		205 Kresge Bldg.

"Watch the WEST STEEL WHEELS Go 'Round"

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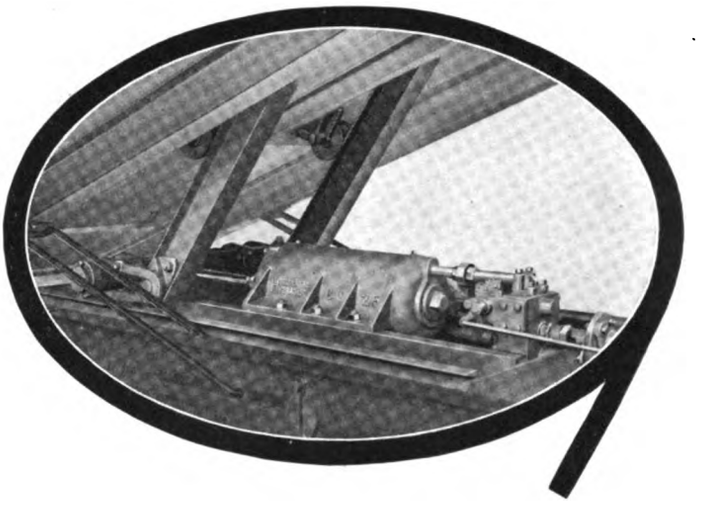

The Easy Roller Action

The easy action of the lifting arms, acting directly against rollers on the under side of the body and in the approximate center of the load, constitutes one of the reasons why most of the prominent truck manufacturers of America have adopted as standard equipment HORIZONTAL HYDRAULIC Dumping Units.

HORIZONTAL HYDRAULIC DUMPING UNITS

Dealers-

The same reasons that have prompted most of America's prominent truck manufacturers to adopt HORIZONTAL HYDRAULIC Dumping Units as standard equipment, will make it worth your while to recommend our equipment to prospective purchasers.

Write for literature

Horizontal Hydraulic Hoist Co.

35 Twenty-Fifth Street Milwaukee, Wis.

Sales and Service Stations

CHICAGO 3755 Wentworth Ave.

DETROIT 605 Gratiot Ave.

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The LAW of LUBRICATION

FOR EVERY MACHINE, *of* EVERY DEGREE *of* WEAR *there is* A SCIENTIFIC SINCLAIR OIL *to* SUIT *its* SPEED AND CONSERVE *its* POWER.

STUDY this Law. Note how it revolutionizes automotive lubrication. Note that the *degree of wear* in a motor determines which grade of Sinclair Motor Oil you should specify.

New motors have snug-fitting parts. After traveling a few thousand miles the parts show wear. After 15,000 miles the parts show *more* wear. For each of these conditions a heavier Sinclair Motor Oil must be used to fill the gaps caused by wear.

We have an interesting Recommendation Index worked out on this basis. You can use it in your business. Write for your copy today.

SINCLAIR REFINING COMPANY, CHICAGO

Atlanta	Denver	Louisville	Omaha
Brockton	Detroit	Minneapolis	Rock Island
Buffalo	Houston	Newark	Tulsa
Cleveland	Kansas City	Norfolk	Wichita

Please mention "Power Wagon" when writing to advertisers.

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Roller Type

"WHITNEY" CHAINS

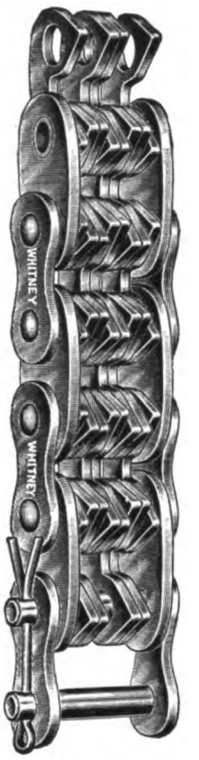
Equip Your Motor Trucks and Tractors with "Whitney" Chains

Now that the motor truck is handling so much of the freight that was formerly cared for by the railroads, it must run on a schedule almost as exacting as that of the railroad train itself. This emphasizes the necessity of selecting a chain which can be relied on under all conditions of speed, road and weather.

THE WHITNEY MFG. CO.

HARTFORD, CONN.

Chains **Keys and Cutters** **Hand Milling Machines**



Silent Type

"The Spring is the Thing"

MATHER SPRINGS

Scientifically Heat-Treated

Unequalled For

Lightness, Flexibility and Endurance

Genuine made only by

THE MATHER SPRING COMPANY

Toledo, Ohio.

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Stewart

MOTOR TRUCKS

Owners' Satisfaction Proved —

1. By use in 38 foreign lands
2. By fleets that grew from one

The international use of Stewarts is no less impressive than the growth of multiple Stewart fleets at home.

Abroad, Stewarts are giving daily and profitable service to owners in 38 foreign countries.

At home, the unique quality of Stewart service has caused the growth in hundreds of cases from the original one Stewart (write for names) to large fleets.

But it isn't the size of a fleet that tells the real story. A big firm may decide to motorize its hauling—may buy 20 to 50 trucks at once. It's the experience of a concern that started with one Stewart, found it a business-winner, bought more Stewarts one after another to keep pace with expansion, which is a real guide.

Here is a letter from an owner. This owner-satisfaction with Stewart performance has made the Stewart Motor Corporation a world leader in truck building in only seven years.

MACON TRANSFER CO.
MACON, GA.

After running our first truck a short while we purchased a 1½ ton truck and four months later we purchased a second one ton.

After all three of these trucks had given us splendid service for six or eight months we decided to purchase our fourth, a ¾ ton Stewart, four months ago, which makes our fleet number four trucks at the present date.

All four of these trucks are giving absolute satisfaction and we will further state that the first one-ton which we purchased is running as good and doing as much work as it did the day we drove it out of your place.

If business increases in the next month as much as it has in the past we will be obliged to add another Stewart to our fleet, which will make five of these trucks.

(Signed) WALTER S. HERIN

Chassis prices f. o. b. Buffalo: ¾-ton $1350; 2000-lb. $1655; 1½-ton $2250; 2-ton $2875; 2½-ton $3095; 3½-ton $3895

STEWART MOTOR CORPORATION, BUFFALO, N. Y.

The Stewart truck has won- by costing less to run

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12

JUN 11 1920

POWER WAGON

Number 187 CHICAGO, JUNE, 1920 Price 50 Cents

Kelly Caterpillars Enabled 5-ton Truck to Haul 16-ton Load Over Mountains

"It was extraordinary," writes Mr. C. H. Hemme, of San Diego, owner of the truck, "to see the rubber of the Kelly-Springfield Caterpillar tire spread itself from underneath the weight of the load and assume its normal shape again when released. We firmly believe that only the Caterpillar tire, allowing the rubber to spread in several directions, saved the day, as no other tire would have stood the extreme overload without coming loose from the steel. For heavy duty service there is no tire that gives me more satisfaction than the Kelly-Springfield Caterpillar tire."

We don't recommend overloading a truck. It is bad for the truck and bad for the tires. But there are times when overloading is necessary, and when that time comes it is a great satisfaction to know that your tires can haul any load the truck can bear.

KELLY-SPRINGFIELD TIRE CO.
New York, N. Y.

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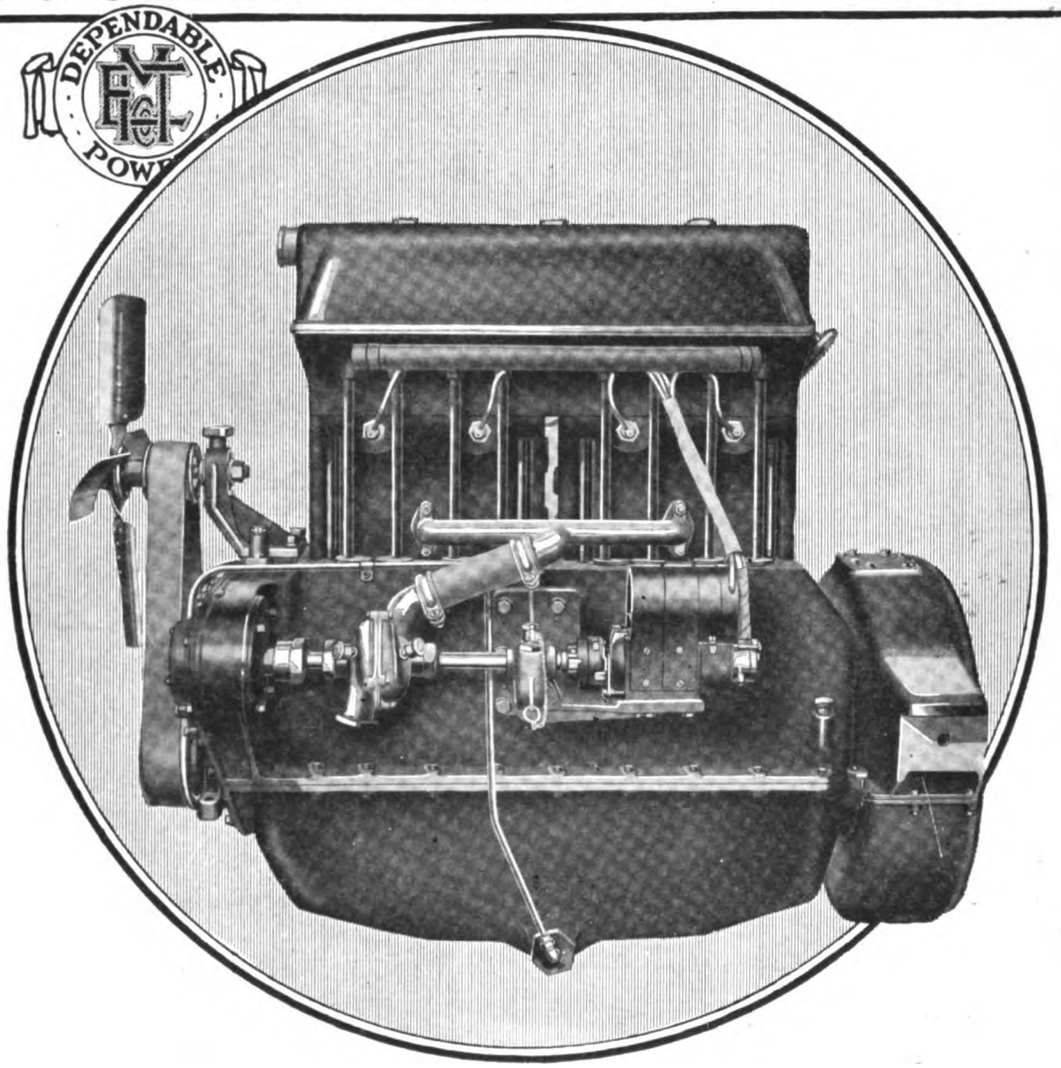
MIDWEST

TRUCK *and* TRACTOR ENGINE



—"never before has there been dependable power like this"

At this time when there is such a shortage of engines *suitable* for trucks we offer you the opportunity to "belt-on-to" our product and our capacity for assured delivery—while it lasts.

We say "while it lasts" because this truck engine has proven so fundamentally "in line" with present-day-demand for heavy duty, high speed truck installation that open capacity will not be available indefinitely.

Many prominent engineers have tested this engine and they have freely stated that here is an engine no truck manufacturer can afford to ignore.

You should look well into the source of your engine supply now, for it may mean your success or the reverse.

Our open capacity is limited to the 4½ x 6" and the 4¼ x 5¼". Both sizes develop considerably more power than any engine of similar bore and stroke that we know of. In fact, both develop power in excess of engines even considerably larger in displacement.

Either size furnished with No. 2 or 3 S. A. E. bell housing or in the open fly wheel type. We can also supply either size for installation in frames 20 inches in width.

Let's go into this matter now before it is too late.

Yours very truly,

MIDWEST ENGINE COMPANY

Sales Div. 16
Indianapolis, U. S. A.

Lonk P. Smith
GENERAL SALES MANAGER

Dependable Power

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Every Long Cooling System is scientifically adapted to the particular engine which it serves, thereby assuring the maximum of cooling efficiency

The Kinship of Years and Efficiency

In the span of a human life, *18 years* are but the attainment of youth, but "18 years" when associated with an institution of foremost rank in the *automotive* industry—this titanic prodigy of commerce—signify the purposefulness and fullness of maturity, the wisdom and resourcefu ness of ripened knowledge and experience; the enthronement of an *ideal.*

Such are our years; these are their fulfillment—strength combined with judgment; fitness united with deliberation; desire associated with capability; success expressive of *merit.*

And these—in unstinted measure—are at your service.

No engine can be more efficient than its cooling system.

The Long Cooling System guarantees the accomplishment of maximum efficiency at minimum cost

LONG MANUFACTURING CO., DETROIT, MICHIGAN

Pioneer Makers of Cooling Systems for Gasoline Engines

LONG

COOLING SYSTEMS

The Recognized Standard for Tractor, Trucks and Motor Cars.

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"NORMA"

PRECISION BALL BEARINGS

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SATISFACTORY service is the one criterion of success, in a machine or in a part of a machine. One failure will wipe out a record that has been months in the making. Year after year, "NORMA" equipped magnetos and lighting generators hold their unchallenged leadership—solely by virtue of their consistently superior service maintained under the most exacting conditions known in the automotive world.

See that your electrical apparatus is "NORMA" equipped.

THE NORMA COMPANY OF AMERICA

Anable Avenue
Long Island City
New York

Ball, Roller, Thrust and Combination Bearings

POWER WAGON

An exponent of the most enlightened thought and practice of the motor truck industry.

Published monthly by

THE POWER WAGON PUBLISHING COMPANY

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THE POWER WAGON PUBLISHING COMPANY

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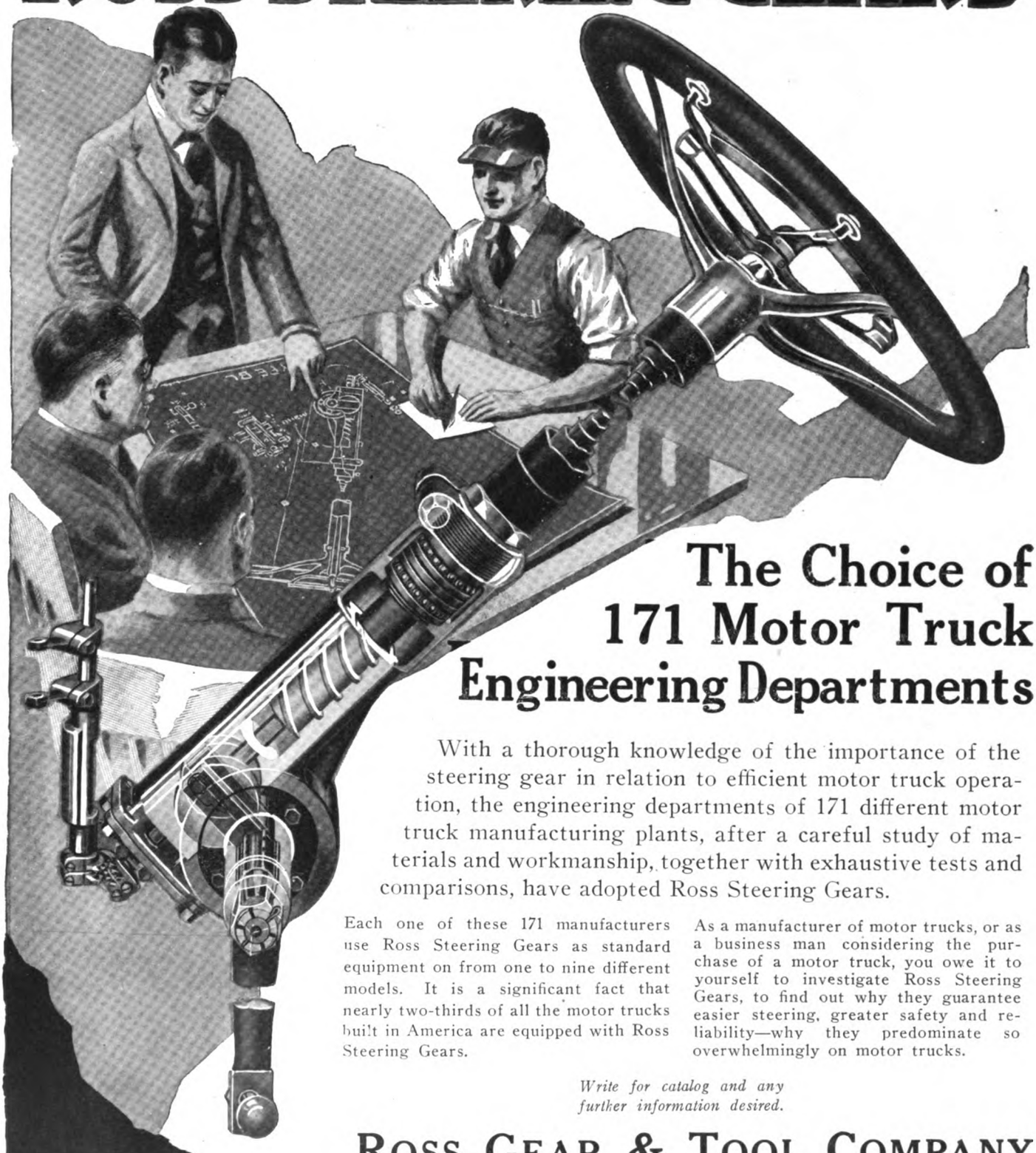

The Choice of 171 Motor Truck Engineering Departments

With a thorough knowledge of the importance of the steering gear in relation to efficient motor truck operation, the engineering departments of 171 different motor truck manufacturing plants, after a careful study of materials and workmanship, together with exhaustive tests and comparisons, have adopted Ross Steering Gears.

Each one of these 171 manufacturers use Ross Steering Gears as standard equipment on from one to nine different models. It is a significant fact that nearly two-thirds of all the motor trucks built in America are equipped with Ross Steering Gears.

As a manufacturer of motor trucks, or as a business man considering the purchase of a motor truck, you owe it to yourself to investigate Ross Steering Gears, to find out why they guarantee easier steering, greater safety and reliability—why they predominate so overwhelmingly on motor trucks.

Write for catalog and any further information desired.

ROSS GEAR & TOOL COMPANY
780 Heath Street, Lafayette, Indiana, U. S. A.

The Steering Gears that Predominate on Motor Trucks

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Drivers Help Clydesdale Dealers to Sell Clydesdale Trucks

IN THE final analysis, it is usually the driver who passes judgment on a motor truck. If a truck has a good reputation among drivers, you can be certain it is a good truck.

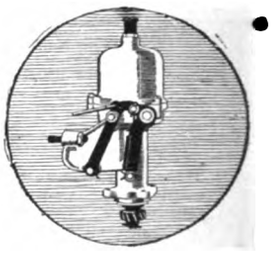
Drivers are boosters for Clydesdale trucks because the Clydesdale is strong on the points which the driver requires. The Clydesdale gives continuous service with minimum repair. It has the sturdy power and strength to come through in a pinch. It has a comfortable all-weather cab and most of all—it's an easy truck to drive. The Clydesdale is the only truck equipped with "The Driver Under The Hood", the automatic controller which relieves the driver of half the effort of operating his truck.

Whenever the opportunity presents itself, Clydesdale drivers praise their trucks highly. The reputation thus formed makes the dealer's part in the sale of a Clydesdale extremely easy.

One to Five Tons Net Load

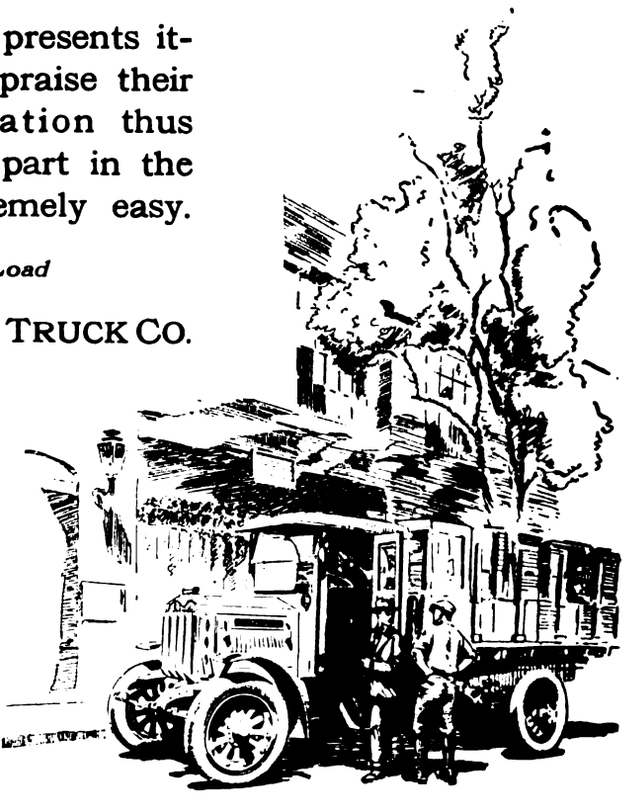
THE CLYDESDALE MOTOR TRUCK CO.
CLYDE, OHIO

No Other Truck Has It



"The Driver under the Hood"

The Clydesdale Automatic Controller



CLYDESDALE

A World Proven Motor Truck

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The struggle to produce a means of multiplying POWER has continued for ages. Each era has added its quota to the sum total of POWER knowledge and achievement. Few needs have ever been greater than those of supplying Energy for the requirements of the human race. ¶ The builder of power-creating mechanism today, therefore, is confronted with an enormous obligation. Upon him rests the responsibility for the CONTINUED development of his product. ¶ The Continental Motors Corporation recognizes this obligation. It is manifested in the Continental organization and in the Continental product. It is one of the factors that guarantees to the manufacturer of Continental equipped cars and trucks and tractors, the MAINTENANCE of the quality standards that have always been associated with the Continental Red Seal.

CONTINENTAL MOTORS CORPORATION

Offices: Detroit, U. S. A. Factories: Detroit and Muskegon

Largest Exclusive Motor Manufacturers in the World

Continental Motors

STANDARD POWER FOR TRUCKS, AUTOMOBILES AND TRACTORS

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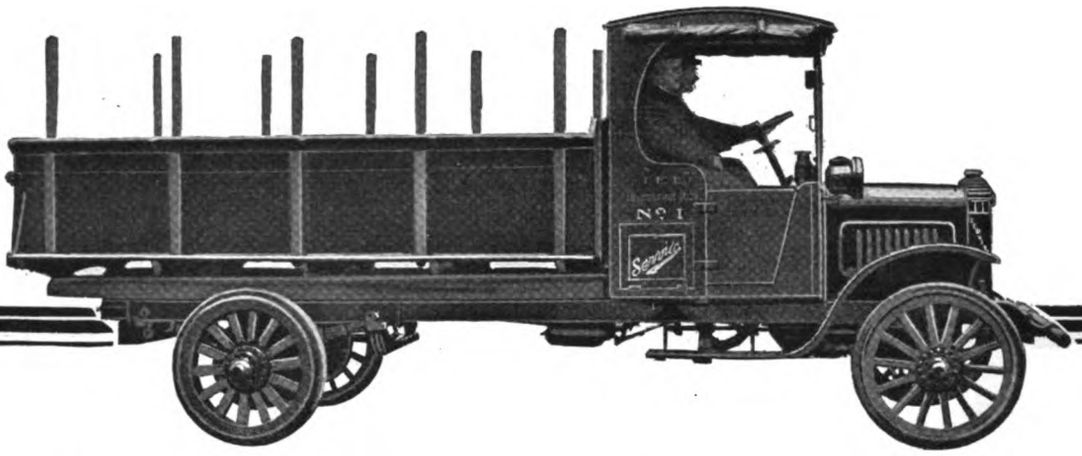

A Statement by Turner Truck Sales Co., Cleveland, Ohio

"We introduced the SERVICE Truck in Cleveland about three years ago. Through the steady co-operation from the SERVICE Motor Truck Co., and under their liberal policies, we were able to meet the very stringent competition in Cleveland, meet it in a way which has brought both our organization and the SERVICE Motor Truck into the very fore-front. As regards the truck itself, we believe that it is justified in its position at the top of the dominant seven makes of motor trucks, and its performance in our territory has certainly upheld all that its name implies."

In the face of strongly intrenched competition *SERVICE* Motor Trucks have established themselves on a sound basis—*SERVICE* dealers accordingly are *prospering.*

There are two good reasons why the *SERVICE* dealer's franchise offers an opportunity of more than usual merit.

First: the quality of the truck itself.

Second: the company back of it.

68% of *SERVICE* sales are *repeat orders*—there could be no stronger evidence of the HIGH QUALITY of the truck itself.

The very liberal policy of the Company and its *close co-operation* in every phase of motor truck selling is a matter of comment among *SERVICE* dealers.

SERVICE Trucks are built in 80 *different combinations*, of power, speed and capacity—a truck to fit every need of every purchaser.

On request we will mail you complete details of a most attractive proposition. Write today stating the territory you desire.

Service Motor Truck Co., Wabash, Ind., U. S. A.

NEW YORK—87-89 West End Ave. CHICAGO—2617-25 So. Wabash Ave.

Service
MOTOR TRUCKS
Builders of Business

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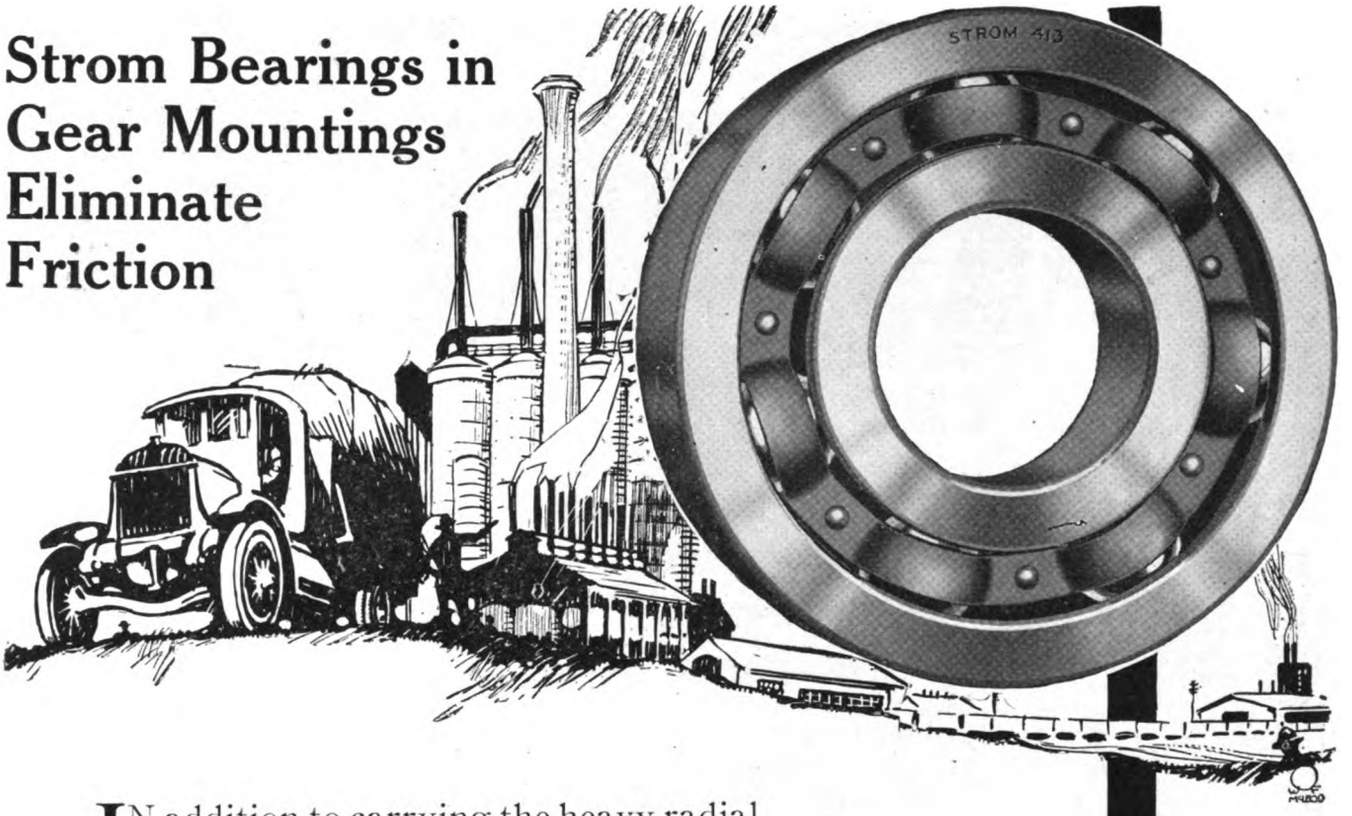
Strom Bearings in Gear Mountings Eliminate Friction



IN addition to carrying the heavy radial loads caused by transmission gears, Strom Bearings eliminate friction and noise.

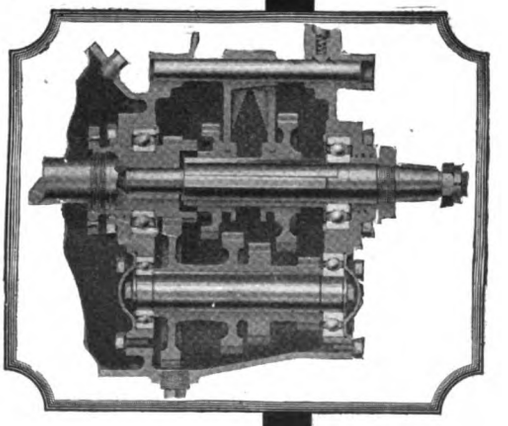
Wherever Strom Bearings are mounted, the gears operate quietly.

Heat-treated by the most modern and approved methods, these bearings give maximum service under the most severe conditions.

In passenger cars, trucks, tractors, machine shops—in fact, wherever a shaft turns, Strom Bearings have demonstrated their superiority.

Our engineers are ready to help solve your bearing problems.

U. S. BALL BEARING MFG. CO.
(Conrad Patent Licensee)
4535 Palmer Street Chicago, Illinois



One method of mounting Strom Bearings in transmissions which gives exceptional service

(60)

Strom BEARINGS

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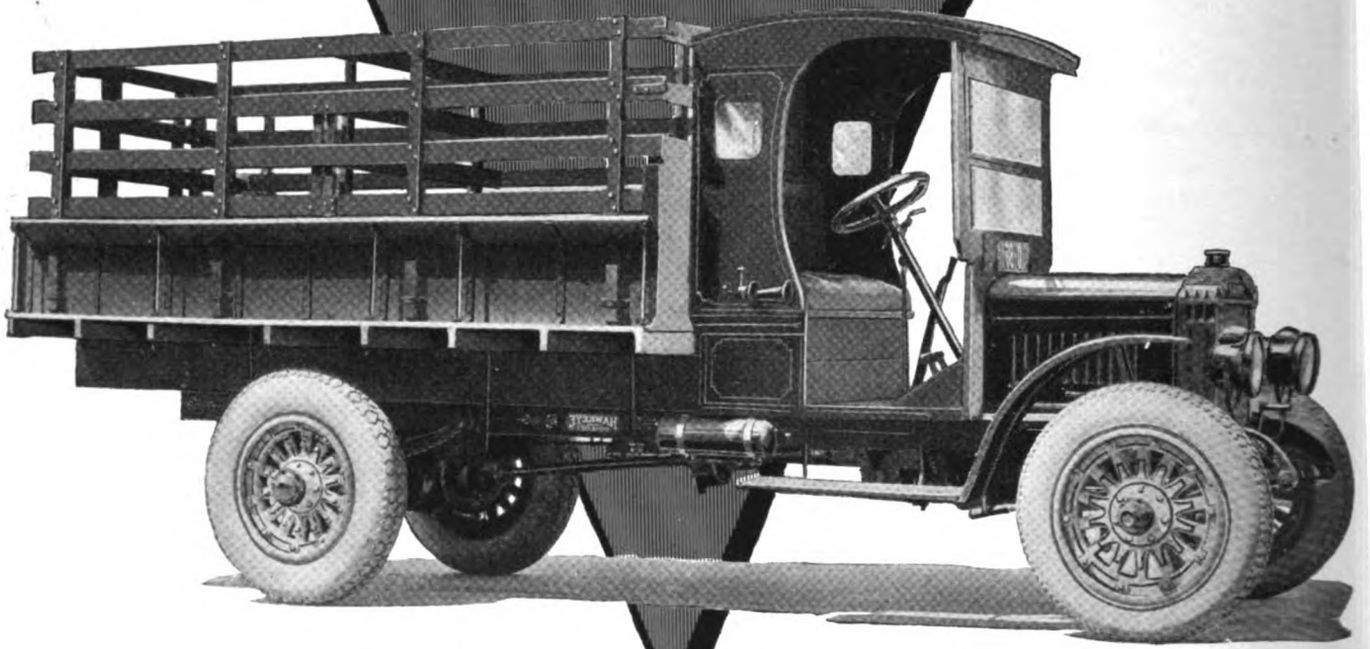
HAWKEYE MOTOR TRUCKS



For Good Dealers West of "the River"

Hawkeye Motor Trucks offer unusual advantages to the progressive dealer in Middle West and Western States.

Deliveries of trucks and parts are seldom held up by railroad congestion, as our factory is out of the congested area. Freight charges are lower. "Quick Service" really means quick service, for the Hawkeye factory is at Sioux City, Iowa, an ideal location for a manufacturer serving the territory west of the Mississippi River.

There are other advantages which cannot be enumerated here but will be furnished gladly to those interested. Besides, Hawkeye Motor Trucks are mighty good trucks. Made in One and One-Half Tons, Two Tons and Three and One-Half Tons Models.

WIRE OR WRITE FOR DETAILS OF OUR PROPOSITION

HAWKEYE TRUCK COMPANY

R. A. Bennett, President

2704 Floyd Avenue **Sioux City, Iowa**

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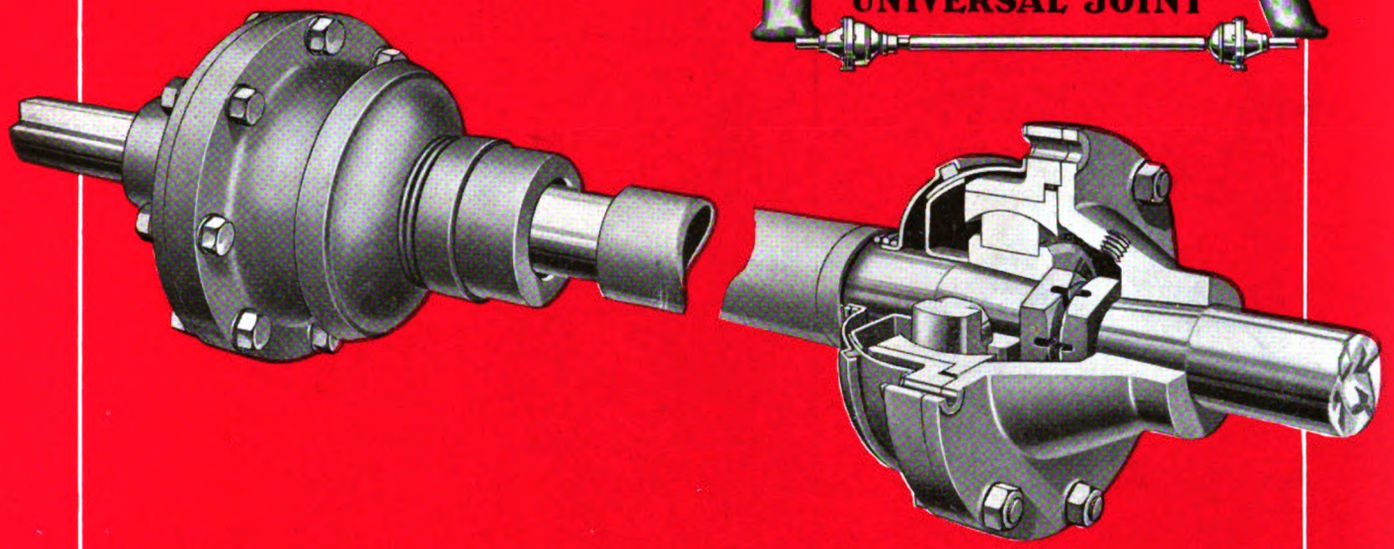
Pick
UNIVERSAL JOINT



Positive, Non-Leak Lubrication

CENTRIFUGAL force and the action of the joint make lubrication in the Pick Universal constant and never-failing.

The lubricant is thrown *out toward* the moving members; every bearing automatically lubricating itself.

Every particle of grease is kept within the housing, and foreign matter kept *out*, by the patented Pick retaining device.

The chief cause of Universal Joint troubles, imperfect lubrication, is *fully overcome* in the Pick Universal Joint.

Equally superior are Pick flexibility, compactness and strength.

Automotive manufacturers and executives are invited to write for fully descriptive Blue Print Portfolio.

MANUFACTURED BY

Carl Pick Company
West Bend, Wisconsin, U. S. A.

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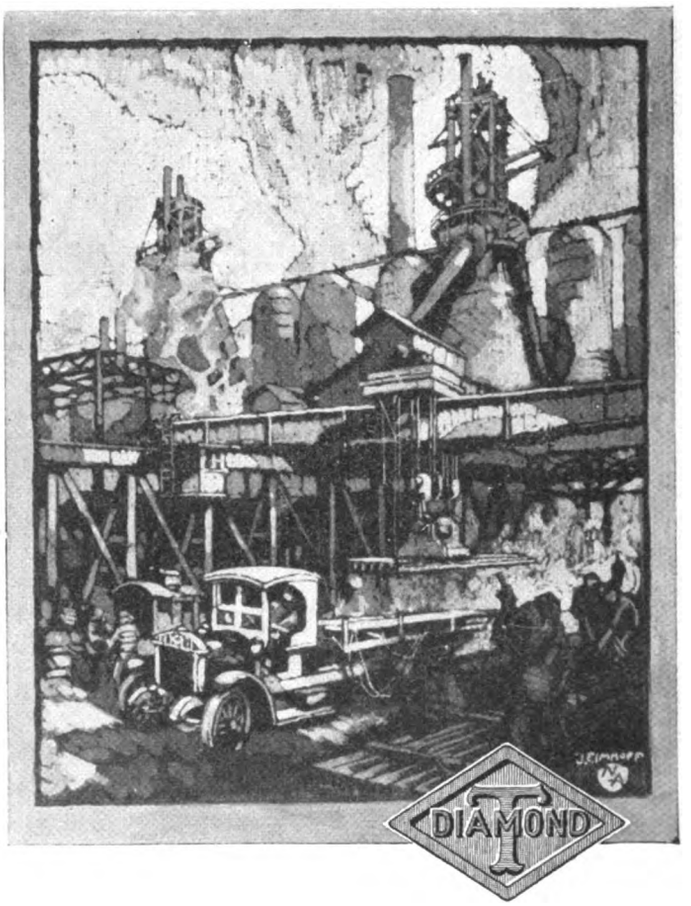
COMPLETE LINE: 1½ TO 5 TONS

"The Nations' Freight Car"

Profits on Diamond T sales ***are real*** *profits, for neither owner nor dealer knows the drain of costly "after service." Why not write or wire for detailed information?*



Cause and Effect

"Service" causes an astonishing proportion of the failures among truck dealers. The cost of keeping customers satisfied overbalances the profits from their sales.

That is not true of men who handle the *right kind of truck.* It has never been true of dealers for Diamond T.

DIAMOND T MOTOR CAR CO.
4525 West 26th Street——CHICAGO, ILL.

Please mention "Power Wagon" when writing to advertisers.

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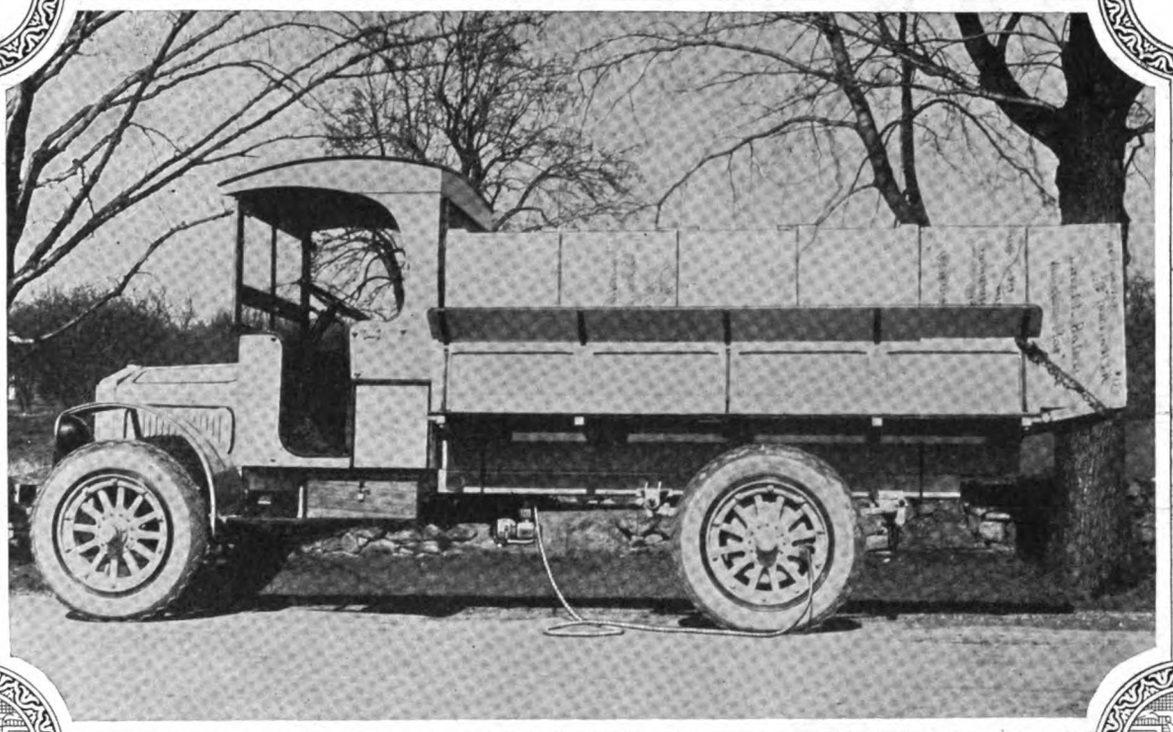

The cost of the time lost on but one puncture—when the truck is not equipped with a KELLOGG ENGINE-DRIVEN TIRE PUMP*—would more than pay the cost of the pump*

The Value of Time

Time lost in the transportation end of a business is as costly as time lost in the manufacturing end. The motor truck stalled on the road with a punctured tire—without a KELLOGG ENGINE-DRIVEN TIRE PUMP and the "free air station" miles away—is increasng the overhead. Practically all of the leading motor trucks and motor cars manufactured to-day are equipped with KELLOGG ENGINE-DRIVEN TIRE PUMPS.

CAUTION

Make sure your Motor Trucks are equipped with KELLOGG ENGINE-DRIVEN TIRE PUMPS.

KELLOGG MANUFACTURING CO., Rochester, N. Y., U. S. A.

KELLOGG TIRE PUMPS

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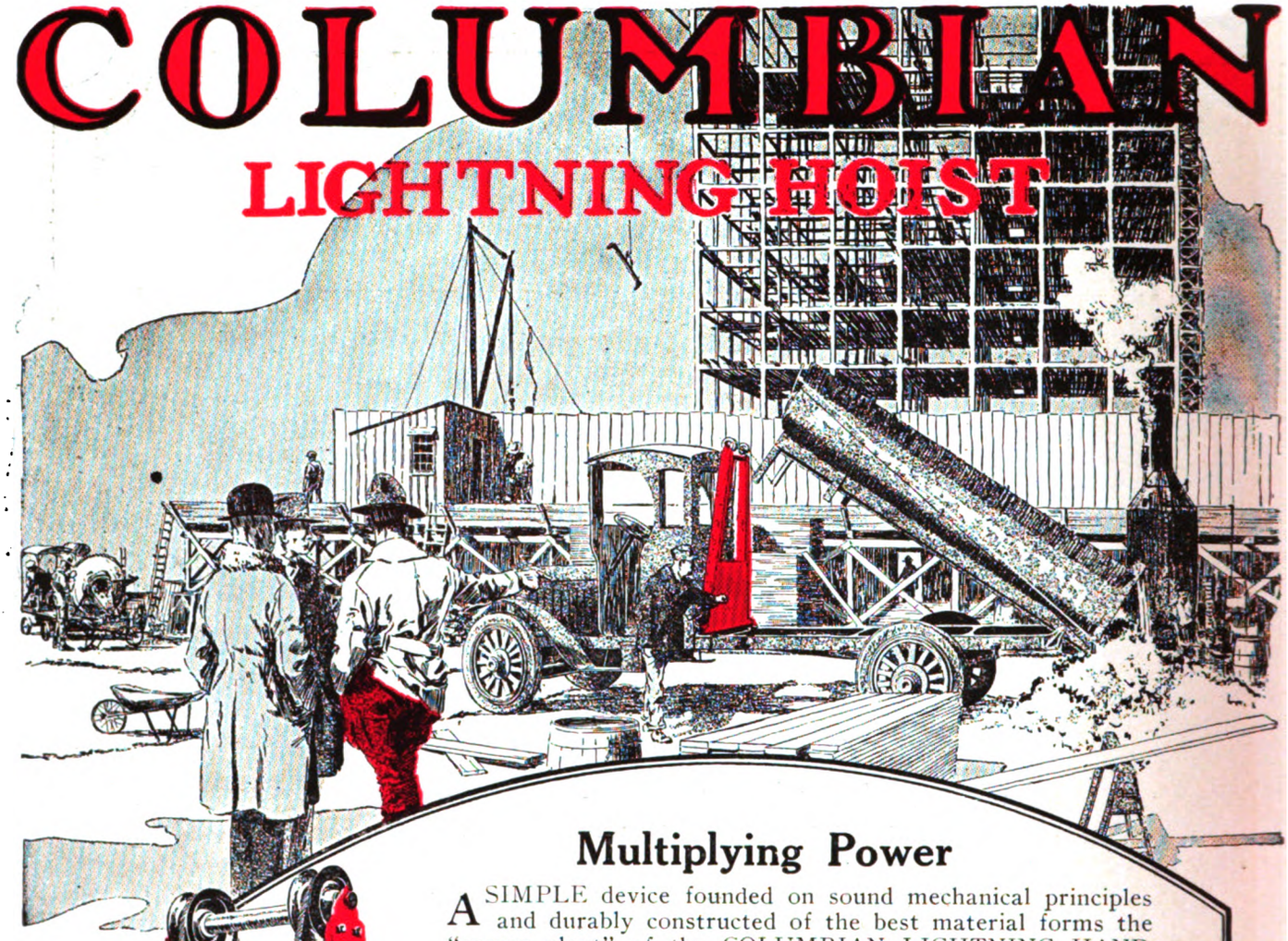
COLUMBIAN
LIGHTNING HOIST



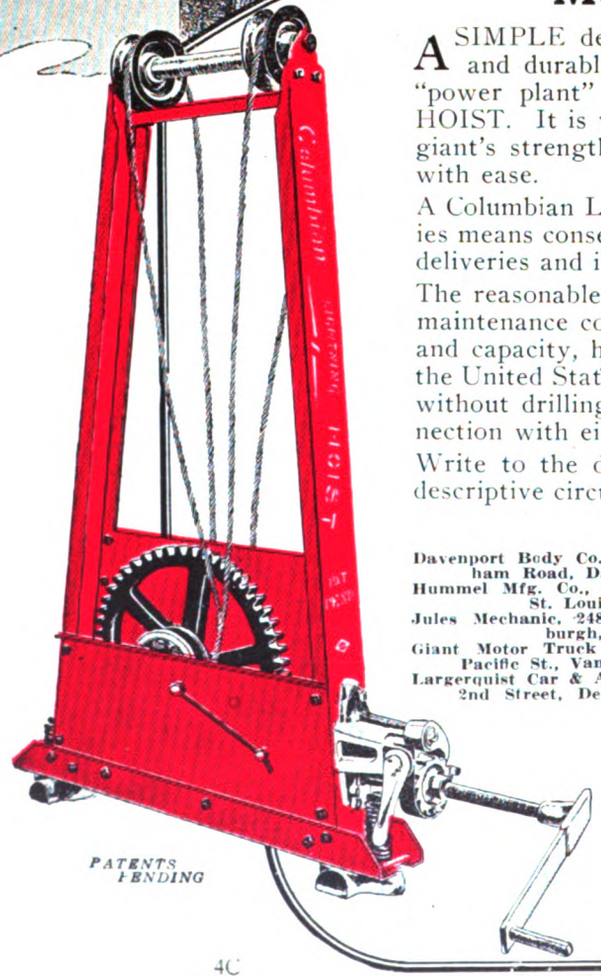
Multiplying Power

A SIMPLE device founded on sound mechanical principles and durably constructed of the best material forms the "power plant" of the COLUMBIAN LIGHTNING HAND HOIST. It is this device which gives the Columbian Hoist a giant's strength, and enables one man to dump a 5-ton load with ease.

A Columbian Lightning Hand Hoist on your truck dump bodies means conservation of high-priced labor, more efficiency in deliveries and increased profits for you.

The reasonable first cost, and almost complete elimination of maintenance costs, together with its power, speed, durability and capacity, have made it the most popular Hand Hoist in the United States today. It will fit any chassis and is mounted without drilling holes in the frame, and can be used in connection with either a metal or wooden dump body.

Write to the distributor nearest to you or to us direct for descriptive circular 8901 and further details.



PATENTS PENDING

LIST OF HOIST JOBBERS:

Davenport Body Co., 1509-33 Bockingham Road, Davenport, Ia.
Hummel Mfg. Co., 3008 La Salle St., St. Louis, Mo.
Jules Mechanic, 248 Croft St., Pittsburgh, Pa.
Giant Motor Truck Co., Granville at Pacific St., Vancouver, B. C.
Largerquist Car & Auto Co., 514 West 2nd Street, Des Moines, Ia.
Albright, S. S., 13th & U. St., Sacramento, Cal.
Beard & Co., 418 Keller Bldg., Louisville, Ky.
Blackwell Motor Co., Cor. 3rd & Post, Spokane, Wash.
Landes & Co., 2nd West & S. Temple, Salt Lake, Utah
Press & Sons, Jacob H., 300 Halsted St., Chicago, Ill.

COLUMBIAN STEEL TANK COMPANY

"Tanks for the World" *Established 1894*

1519-1625 W. 12th St., Kansas City, Mo.

4C

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Hitting the Low Spots

Whether bad roads are encountered only once in a while, or are a normal condition met every day, the motor truck you sell should be able to ignore them completely. One of the chief virtues of Patriot Motor Trucks is their ability to "hit the *low* spots" as serenely and undisturbed as though the miles of mud holes were smooth surfaced pavement.

Patriot Motor Trucks are equally indifferent to conditions of road, load and weather. They do their work willingly and well, whether running on a paved highway or through sloughs of stiff, clinging mud. Designed for rough work, built for bad roads, Patriot Motor Trucks everywhere are making unusual records for extraordinary performance in every kind of service on the farm and in the city.

Isn't This the Kind of Truck You Want to Sell?

If we are not represented in your territory, write for our proposition.

PATRIOT MOTORS COMPANY, MANUFACTURERS

1419 P Street, Lincoln, Neb.

Revere Model	Lincoln Model	Washington Model
1500 to 2500 lbs. Capacity	3000 to 5000 lbs. Capa ity	5000 to 7500 lbs. Capacity

PATRIOT

MOTOR TRUCKS

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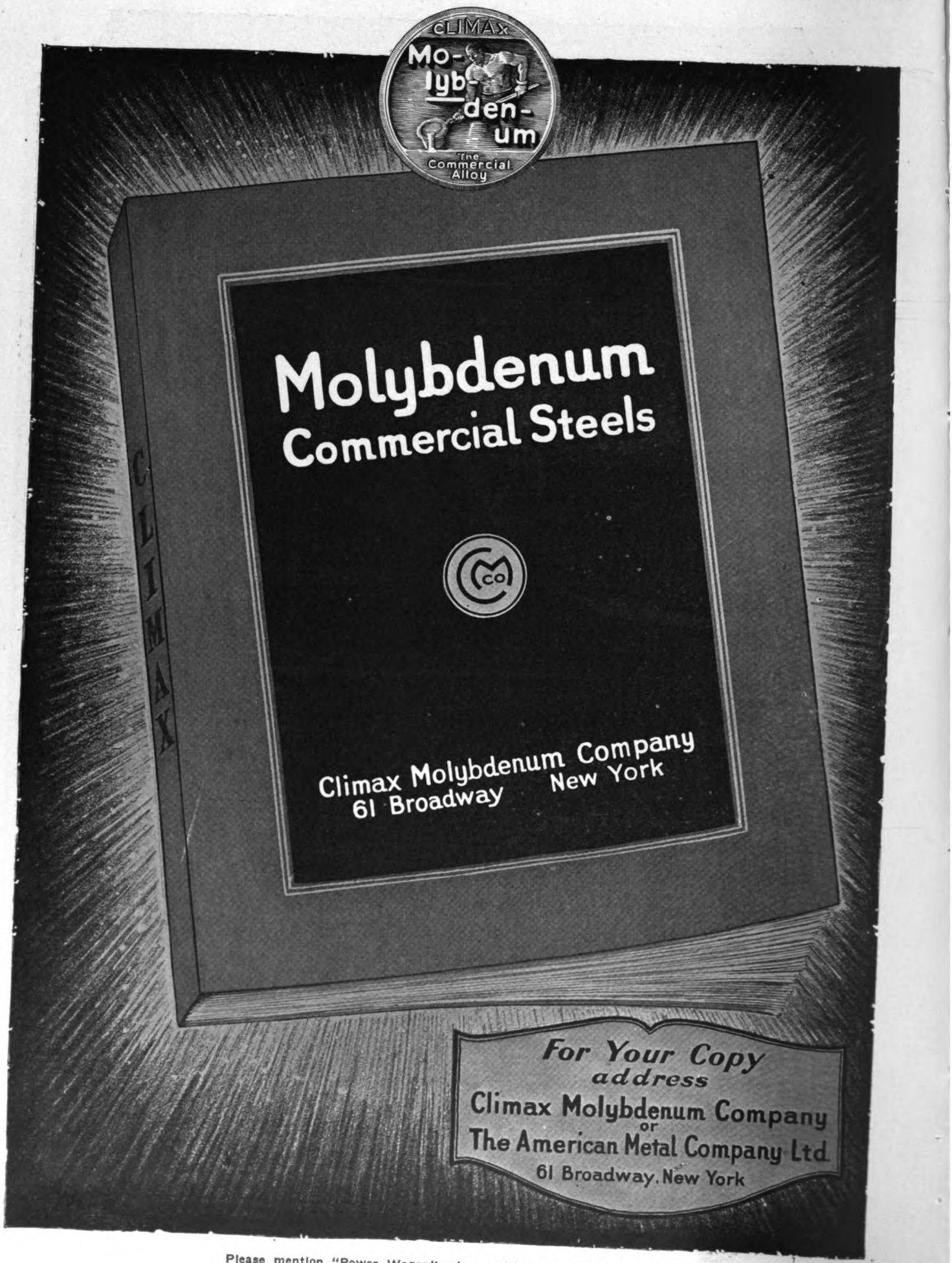

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General Motors Trucks

NO more opportune time ever presented itself for marketing motor trucks.

During the past few years the demand for trucks has been surprising; it is now overwhelming; and what the future holds may be gauged by the past and the present.

All the forces of industry seem to center about transportation, and motor trucks have a most promising place in the picture.

To be a motor truck dealer and to be connected with a manufacturer whose permanency is assured is a fortunate position in the automotive industry.

A GMC dealer is in that position. Behind him is the prestige of a great name, a sound institution and a genuinely good product.

Co-operating with a GMC dealer are highly organized sales and service departments and nation-wide advertising.

If you are not in the ranks of General Motors Truck representatives and would like to know more about the GMC proposition, just write.

GENERAL MOTORS TRUCK COMPANY

One of the Units of the General Motors Corporation

PONTIAC, MICH., U. S. A.

(650)

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The Short Wheelbase Proves Its Value

Loading in cramped coal mines, dumping from the end of a narrow pier, delivering coal direct to the bins inside a big plant, this Autocar and the three others in the Mudler fleet are daily proving the value of their short wheelbase construction. Under these exacting conditions they have developed with a few months a profitable hauling business for H. M. Mudler, of Hays Borough, Pa.

In June, 1919, he bought his first Autocar, which earned enough by December to pay for itself and buy a second. A third Autocar was added in March and a fourth in April.

The short wheelbase handiness of these Autocars has eliminated wheelbarrow handling and has done away with traffic obstruction that previously caused complaint.

Chassis (1½-2 Ton)
$2300, 97-inch Wheelbase
$2400, 120-inch Wheelbase

THE AUTOCAR COMPANY, Ardmore, Pa., Established 1897

The Autocar Sales and Service Company

New York	Boston	Philadelphia	Chicago	Pittsburgh	San Francisco
Brooklyn	Providence	Allentown	St. Louis	Los Angeles	Oakland
Bronx	Worcester	Wilmington	Baltimore	San Diego	Stockton
Newark	New Haven	Atlantic City	Washington	Fresno	Sacramento
	Springfield	Richmond	Atlanta	San Jose	

Represented by these Factory Branches, with Dealers in other cities

Autocar

Wherever there's a Road

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POWER WAGON

VOL. XXIV. CHICAGO, JUNE, 1920. No. 187

20 Per Centum of Trucks Delivered Over Highways

NUMBER TO INCREASE IN FREIGHT JAM

WASHINGTON, D. C., May 24.—Appeals, protests and variegated tales of woe pouring into the offices of the Interstate Commerce Commission at Washington from all sections of the country indicate that the motor truck and allied industries have been as hard hit as any commercial interest by the railroad transportation situation. Figures just placed before the Interstate Commerce Commission indicate that more than 20 per centum of the motor trucks manufactured are now being sent over the road and that this proportion will be further increased. However, there must remain a considerable percentage of motor trucks that, for one reason or another, can not be sent out on the drive-away plan.

Worse than the situation with reference to the finished product is the predicament of many of the motor truck builders and

(*Continued on page* 19.)

Export Commercial Motor Cars Shows Healthy Market Condition

Exports of commercial motor trucks from the United States for the months of October, November and December of 1919, and for January and February, 1920, are represented by the following figures taken from the reports of the Bureau of Foreign and Domestic Commerce:

Month—	No.	Value
October	1,301	2,931,204
November	1,712	3,143,351
December	1,465	2,495,685
January	1,721	2,727,856
February	2,889	4,130,468

By far the greater number of motor trucks went to France, England and Canada, the remainder of the exportation being divided between over one hundred other countries.

Vulcan Motor Axle Company to Be in Production By Early Fall

Announcement is just made of the Vulcan Motor Axle Company of Detroit. Following are the executive officers: F. C. Gilbert, president and treasurer; R. B. Weaver, vice president; Sidney C. Love, vice president; C. C. Miller, vice president; J. T. Hanlon, secretary, and R. G. Beechler, chief engineer. These men have not only been prominent in the axle industry since pioneering days, but have been associated with one another constantly for over ten years.

The new concern will build a complete line of axles for motor vehicles. It is capitalized at $1,000,000. A large modern plant has been obtained with ample trackage in the heart of Detroit's Milwaukee Junction manufacturing district. The plant has already been arranged to carry out the production plans of the new company. Machinery and equipment, all of which has been delivered, are being installed. Production will start early in the fall.

Tax Ruling on Semi-trailers To Be Fought by Association

NEW YORK, MAY 26.—Representatives of 21 trailer manufacturing companies voted at a recent meeting of the Trailer Manufacturers' Association, held in Detroit, to contest the recent ruling of the bureau of internal revenue that semi-trailers are taxable as parts of motor trucks under the revenue act of 1918. Efforts will be made to obtain a revision of the new ruling which is directly opposed to the ruling issued by the bureau a year ago that "trailers regardless of the number of wheels they may have, are not parts of or accessories for automobile trucks," and therefore not taxable. If unsuccessful, the matter will be appealed and if necessary carried into the court to test the validity of the new ruling. The manufacturers decided to stand as a unit and fight the ruling through the association.

Fay 'Bus Line of Rockford, Illinois, Wins Fight Against Street Railway

SPRINGFIELD, ILL., MAY 25.—The Fay 'Bus Line Company, Rockford, Ill., has been granted a certificate of convenience and necessity by the Illinois State Board of Public Utilities, ending a long fight to secure this concession. The street railway company of Rockford, opposed the action, due to the costly competition. With the victory of the Fay company it is planned to increase the capital stock from $40,000 to $200,000. In addition to handling 'buses to urban and suburban points, the Fay company operates a daily motor truck service between Rockford and Oregon, a distance of twenty miles. Other lines are planned. One of the new lines will be a Chicago-Rockford service for freight and express. An order has been placed for five White motor trucks, each of 5-ton capacity. A bunk has been arranged over the driver's seat in which the latter may sleep in the event of a night tieup.

Trailer Business Shows Large Increase in 1920

3 MONTHS' VOLUME EQUALS 1919 OUTPUT

NEW YORK, MAY 26.—As many trailers were manufactured and sold during the first three months this year as during the whole of last year. The production would have been greater if the manufacturers could have secured deliveries of parts and materials and been able to ship the finished trailers. Demand for trailers has increased satisfactorily during the last six months, and a steadily increasing volume is anticipated confidently by the manufacturers.

During a three-weeks' trip among the factories from New Hamoshire and Massachusetts to Illinois and Wisconsin, H. W. Perry, general manager, and H. C. Fruehauf, vice-president, of the Trailer Manufacturers' Association, found great activity in the industry and a general feeling of optimism. A number of companies have just reorganized, with new and additional capital; several have just moved into new and enlarged factories, others are building new plants, while still others have factories or additions projected for construction this year. Some new companies are

(*Continued on page* 24.)

Motor and Accessory Manufacturers Oppose the Metric System

Following a referendum taken among its membership of more than 350 representative manufacturers of automobile parts and equipment, the executive committee of the Motor and Accessory Manufacturers' Association, at its recent meeting at Atlantic City, adopted resolutions opposing the introduction of the metric system in American industry.

The resolution was prompted by the present active propaganda in favor of the compulsory adoption of the metric system of weights and measures. The reasons for opposing this move are definitely summarized as follows:

That it is uneconomic; that the advantages of the metric system are not offset by the disadvantages; that the benefits of the metric system do not justify the enormous expense which would be entailed through the necessary changes in sizes of product and equipment (which would mean an excessive loss through destruction of the present equipment not adapted to the new system); and through the education of employees and customers.

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Facts Contradict Yarn of Gasolene Shortage

OIL MEN SAY FAMINE NOT NEAR

WASHINGTON, D. C., May 24.—Leaders in the motor truck industry, in company with representatives of other automotive industries, have lately been in Washington on an interesting mission. These workers for trade stability appealed to leading government officials to do their part to put an end forthwith to alarms regarding the future of the petroleum industry. The effort is part and parcel of the larger movement to prevent injurious reaction upon the automotive industries from the recent increases in the price of gasolene and other petroleum products.

When gasolene prices, after being pegged during the war, started their present gradual ascent, the well wishers of the motor truck and allied industries looked into the whole question most carefully. They consulted in confidence many of the foremost oil men of the country and were told that whereas the normal functioning of the law of supply and demand was bound to mark up prices it was unlikely that the increases would reach a point much, if any, above 35 cents per gallon. With the peak attained, the outlook is for enjoyment of the fruits of the drilling now in progress with hope for a gradual recession of prices to a point below 30 cents. More consoling than all else, the investigators were told that there is no warrant for the dark rumors of the exhaustion of petroleum resources and the talk of "one dollar gas." As one of the leading operators of the world reassured the truth seekers: "There will be plenty of gasolene for you, for your children and for your children's children."

Convinced that rumor and overfed fear can play havoc with the industries that are dependent upon liquid fuel, the leaders of the industry have made several separate and distinct moves to restore public confidence. First, they have appealed to Washington, as has been stated, to call a halt on the issuance, from the United States Bureau of Mines or the United States Geological Survey, or any other source whose official character lends weight, of any statements that set a tentative time limit upon our continued enjoyment of moderate-price "gas." The argument of the representatives of the industry who have lately made a special trip to Washington is that with the industry at work on carbureters to permit the use of substitute fuels and with oil prospecting in progress and with the cracking process undergoing new improvement no man can say what to-morrow holds in the petroleum field. Therefore it is unjust for any federal official to attempt to fix hard and fast limits upon our undeveloped resources or to say that we have only enough petroleum to suffice for 25 years or any other definite period.

Coincident with this drive to quiet excitable government scientists, the automotive men are appealing to the oil men to refrain from the circulation of disquieting statements in order to justify an advance of one cent in the price of gasolene. The attitude of the trade is that if the petroleum men can show justification for advances on prices the consuming public will not revolt. It has been cited in this connection that purchasers have faced advances of hundreds of dollars in car and motor truck prices without flinching. Therefore it is argued that it is poor policy for any petroleum purveyor to indulge in panicky talk to the effect that gasolene resources are rapidly being exhausted and "you will be lucky to get it at any price." Finally, the motor truck manufacturers and operators are to be appealed to anew in this connection to encourage the strictest conservation of gasolene. Especially will motor truck manufacturers be urged to equip all commercial motor vehicles with self-starters, it being the conviction of the students of the situation that only the universal installation of self starters can motor truck operators be induced to stop their motors when the vehicles are standing. It is the continuous operation of motors while the vehicles are loading or standing at the curb because the driver would fain dodge a back-breaking chore later on that is held mainly responsible for the preventable waste or gasolene in the motor truck industry.

Parrett to Make Trucks

In addition to the Parrett tractor, the company will produce a motor truck of approximately 1-ton capacity designed particularly for the farmer's use, and a light tractor cultivator, both of which are to be companion products to the tractor.

The motor truck is to list at somewhere around $1,750.00, and it is planned to produce 2,400 of them for the first year. The cultivator, which is to be also capable of plowing, is to be offered at about $1,000.00 list. Its first year schedule calls for 1,800, though those who are close to the company expect that more than this number will be turned out.

Tractor sales will be in charge of E. F. Sanders. Motor truck sales will be in charge of Herbert L. Scharlach, formerly sales manager for the F. A. Ames Company, later sales manager of the Sterling Motor Truck Company, of Milwaukee, and recently with the Republic Motor Truck Company, first in charge of eastern sales and then in the western territory.

"Avery" Is Name of New 1-Tonner to Be Produced by Bartholemew Co.

The Bartholemew Company, of Peoria, Illinois, announces that by July 1 it will have in production a 1-ton motor truck to be known as the "Avery." The enviable reputation behind this company through its many years of operation in the manufacturing business sounds a note of more than usual interest in this brief announcement to the motor truck industry, since the mere announcement of the coming unit is an assurance of real worth and proved quality.

Mail Service Expansion to Benefit Truck Makers

NEW ROUTES ARE BEING CONTEMPLATED

WASHINGTON, D. C., May 23.—There are a number of provisions of interest to motor truck tradesmen in the Post Office Apppropriation Act which has lately become a law. Prominent among the new projects is the creation of a special commission which shall investigate all present and prospective methods of transporting the mails and make report to congress with recommendations on or before March 1, 1921. Men in the industry are confident that a scientific, comparative study of the various available instrumentalities for the movement of the mails is all that is needed to insure the delegation to motor trucks of a much larger share of the work than is now assigned in this quarter.

Far-sighted power wagon men are also elated because the new act makes an appropriation of $1,250,000 to expand the aeroplane mail service. Motor truck men who have looked into the subject realize, as some of their brethren may not, that motor truck service is a necessary complement of aeroplane service and that just in proportion as the air service expands will there be need of increased numbers of motor trucks to transfer the mail between the landing stations and the city post offices.

In connection with the appropriation of $1,250,000 as an allowance for the purchase, hiring and maintenance of vehicles the Postmaster General is authorized to apply a portion of the expense fund to the leasing of quarters for the housing of government-owned automobiles.

Goodyear University Opens Doors to 6,000 Company's Workers

AKRON, OHIO, MAY 22.—Goodyear University, the only institution of its kind in the world, was dedicated formally in April. It has a faculty of 115, an enrollment of nearly 6,000 in over 500 separate classes which are in session 16 hours daily, and an equipment of 65 large classrooms, four fully equipped laboratories and several lecture and assembly rooms in Goodyear Hall, the new employes' recreational building. The university's flexible curriculum embraces studies ranging from Americanization work for the foreign born, and elementary grade school education for the illiterate, to scientific and postgraduate courses, designed more specifically for college and high school graduates.

Goodyear Hall has one of the largest theaters in Ohio and also one of the largest and best equipped gymnasiums in the country. The former seats 1,686. The latter seats 5,000 and has a floor big enough to permit five games of basketball simultaneously. The hall also has a cafeteria big enough to serve 4,000 an hour, 12 bowling alleys, six rifle ranges, eight pool and billiard tables, dormitory rooms for both men and women, over 50 individual shower baths, and large reading and rest rooms.

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Rate Schedules Demand Highway Standardization

CONGRESSMAN ESCH OFFERS HIS VIEWS

Problems connected with the development of highway transportation were taken up at a conference in Washington recently, said by students of transportation to be one of the most significant meetings of the kind ever held in the national capital.

Congressman Esch, of Wisconsin, chairman of the Interstate and Foreign Commerce Committee, and author of the railroad bill, gave to the conference his views on the use of the motor vehicle as a vital link in the country's general transportation scheme. He touched upon the attitude of railways to other forms of transport and expressed the view that the railroads were not antagonistic to the newcomer in the transportation field—the motor truck. He expressed the belief that as roads were built of such character as to make highway rate making practical, much of the short haul would shift to the highway, to the economic advantage of the railway and the general public as well.

In a rather interesting manner Mr. Esch sketched some of the problems which will confront the people as they enlarge the use of the highways in the adoption of the motor truck. One of these problems was how to arrive at a practical schedule of rates. It was his opinion that the boundary lines for rate making, or the fixing of maximum and minimum charge could come only after standardization of the road surfacing, at least to such an extent that operating costs could be determined upon a fairly accurate basis.

Through bills-of-lading from farm to ultimate delivery in distant city was one of the significant forecasts made by Mr. Esch. He also expressed conviction that the use of the motor truck and the organization of rural transportation routes would go far toward meeting the farm labor problem by releasing time now spent in hauling for use in greater crop production.

Senator Townsend of Michigan, chairman of the Senate Committee on Post Offices and Post Roads, also addressed the conference on the need for a national highway system as the backbone for state and county systems. As the author of the proposed National Highway Act now pending in the United States Congress, he explained the principles and status of the measure which seeks to place the highway work of the country upon a more definite basis.

Virginia Mothers New Idea

A highway educational enterprise has been launched in Virginia never before attempted by any state, according to highway officials and others connected with the better road movement. General C. C. Vaughan, Jr., president of the Virginia Goods Roads Association, and D. B. Ryland, of Lynchburg, secretary, have contracted for the production of a film to be entitled "Virginia's New Hour," in which an effort will be made to get before the public a complete revaluation of the state in the minds and heart of the people, and to create a new conception of the highway as a public utility.

The significance of this enterprise, highway authorities say, is nationwide. Other states have taken steps to overhaul their highway laws and their construction and maintenance methods, but it has remained for Virginia to take the lead in one of the most comprehensive and far-reaching studies of the highway and its relation to all walks of life ever undertaken.

20 Per Centum of Trucks

(*Continued from page* 17.)

accessory manufacturers with respect to fuel and raw material. Statements reaching the Interstate Commerce Commission tell of plants operating at only 40 to 50 per centum of capacity with imminent danger of further contraction. Washington hears, too, of the extremities to which motor truck interests have been driven in order to obtain shipments of parts, the lack of which has held up production. Some manufacturers are represented as using the parced post to an almost unbelievable extent, this recourse involving the breaking up of shipments into small units in order to come within the parcel post weight limits, whereas others are transmitting bearings, etc., in trunks and suit cases as baggage.

One of the vigorous protests just registered at Washington by the automotive industry representatives who are making common cause in their distress over the transportation situation deals with the diversion of special automobile cars to other forms of traffic. There are about 103,000 automobile freight cars on American railroads, but they are all in pretty good condition, as compared with some other rolling stock, having been built within the past ten years, and consequently shippers in various lines are eager to pick off these commodious cars regardless of the fact that it is the season when they are most needed for automobile shipments. Incidentally it is encouraging to learn that one of the first actions taken by several leading railroads following the return to private management was to contract for additional automobile cars. The orders already placed aggregate upward of 10,000 new freight cars designed specifically to accommodate motor trucks and passenger cars, but it will be close to a year before this rolling stock is available.

Motor truck men who are inconvenienced by the present shortage of freight cars and the congestion at terminals and junction points have one consolation that is denied to other shippers or receivers of goods. For the motor truck man it is the proverbial case of the ill wind. Nothing is better calculated to drive merchants and manufacturers in general to the use of motor trucks for highway transport as well as for local delivery than the present stagnation and chaotic conditions in the field of railroad transportation.

The French government presented to the marshals and leading generals of the country the motor cars they used during the war.

U. S. Convoy Report Urges National Highway System

ROADS COMMITTEE GIVES WORK OUTLINE

Declaring the problems of highway construction are national rather than the concern of the individual states, the report of the War Department to the Highways Committee of Congress, summarizes conclusions reached as a result of the army convoy of seventy-three motor trucks which blazed a trail from Washington to the Pacific Coast last summer. The report recommended the construction of a federal system of national highways.

Urging as a commercial asset, the need for "a comprehensive system of national highways," the report voices the opinion that the transportation arteries of the country should be built to accommodate the rapid movement of heavy vehicles during any season of the year.

The recommendations of the department are as follows:

"*First*—That the necessity for a comprehensive system of national highways including transcontinental or through routes east and west, and north and south, is real and urgent, as a commercial asset to further colonize and develop the sparsely settled sections of the country, and, finally, as a defensive military necessity.

"*Second*—That the existing roads and bridges, especially in the sparsely settled sections of the Middle and far Western States, are absolutely incapable of meeting the present day traffic requirements, and until modern types of roads and bridges are constructed which will permit the rapid movement of heavy motor cargo vehicles during any season of the year and in all conditions of weather, economoicoal transcontinental highway traffic will continue to be but a vain hope.

"*Third*—That the road problems of the Middle and far Western States are national rather than local problems, as these states, while possessing vast area and tremendous mileage of highways, have only a sparse population which can not possibly undertake the needed highway improvement work, which moreover is usually of greater importance to the country as a whole than to the individual states.

"*Fourth*—That the radius of action and resulting utility value of the motor vehicle is limited only by the condition of the roads, and that the provision of adequate roads will have a far-reaching effect on the economic development of the country at large.

"*Fifth*—That the types of motor vehicles, especially those used by the army, should be coördinated with the road conditions. In other words, until such time as all sections of the country are connected by improved highways that are passable to heavy motor vehicle traffic at all seasons of the year, the size and weight of vehicles should be limited to types of light and medium capacities."

Receipts of the automobile division of the Pennsylvania state highway department during 1919 reached a total of $5,090,645.

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Built in a new, modern axle plant, conveniently located in Chicago's steel and iron manufacturing district, where every facility for the prompt supply of necessary axle material is at hand.

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POWER WAGON

An exponent of the most enlightened thought and practice of the motor truck industry.

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Tampering with Prices

THERE probably never was a time in the history of this industry when the practice of price-cutting was as prevalent as it is to-day, and there certainly never was a time when the habit was so unjustifiable. In the early days, when men were anxious to make some inroads into a backward market and when a great many shabby practices were utilized to offset the ignorance and prejudice of the prospective buyer, there were occasions when "bargain prices" could be excused even by some of those who are most fixed in their opposition to this pernicious evil. But even those flimsy apologies, for what nearly everyone recognized as an injudicious expedient, should make no appeal to-day when the demand for motor trucks far exceeds the visible supply and when there is every reason to believe that the productive capacity of this industry will for many years to come lag far behind the needs of our apparently unlimited market opportunities.

We have not heard of anyone who has attempted to offer a reasoned apology for price-cutting, and, in our opinion, there is none to be advanced. Expediency, which is the only excuse worthy of consideration, may dictate concessions, but can never justify them, and price-cutting is a concession of the most discouraging kind. To offer a price reduction is to open the way for the most vicious and successful counter-tactics by even the unsophisticated buyer, while its effect on whatever self-respect the seller retains is purely destructive.

A price which requires reduction may indicate many things. It may show merely a lack of confidence on the part of the seller, a lack of selling ability, or fear. It may reveal dishonesty in the fixing of prices, cheapness in the product offered for sale, or general irregularity in business methods. It is, in any case, an insult to the intelligence of a careful buyer and an imposition on the credulity of an unwary one. It is an admission that the correct price is even lower than the one quoted, and that whatever the seller obtains above that unspoken minimum represents the measure of the buyer's sharpness.

All these remarks are predicated, of course, on the current theoretical assumption that price is determined by and related to cost and not value. Were the latter the standard of price determination, list prices would be wholly useless and prices would be more often raised than lowered, since to most buyers the value of a motor truck is many times the price they are asked to pay. The very fact, that prices are invariably adjusted in a downward direction and rarely, if ever, upward, substantiates the general theory of prices and removes the only serious attempt at justification of the price-cutting practice.

It is gratifying to observe the apparently growing disapproval of the habit which is finding voice in various quarters. Manufacturers, though often themselves a party to the practice, have not hesitated to condemn it, and the recent congress of motor truck sales managers supplied ample evidence of their desire to eradicate the evil. Retailers, often inadvertently led into the price-cutting trap, sometimes by the buyer and sometimes by the manufacturer, and often embracing the plan knowingly but with skepticism as to its reflex action, are also loud in their condemnation and occasionally active in their denunciation. One local trade organization, the Cincinnati Motor Truck Dealers' Association, has taken the firm ground that the practice is undeniably wrong and demoralizing, and has agreed that the plan shall be considered taboo and that violating members shall be expelled.

The present is particularly opportune for inaugurating an inflexible trade policy of price maintenance, since the resistance offered by the prospective buyer is now at its lowest point. The industry has the opportunity now of adopting a uniform attitude toward this business canker and of upholding it with the minimum of effort against a weakened opposition. High prices can be more easily justified than ever before. The motor truck is an essential factor in commerce, and production is far behind demand. The problem calls for clear thinking, decisive action, and only a modicum of courage.

Automobile Fatalities

EVEN the most casual observer must have noticed, particularly in the large cities, what the compilations of statisticians have for years been showing, namely, that the increase in motor vehicle traffic has far outdistanced our development of facilities for handling it, and that the problem has long since passed the stage for listless examination and now requires the closest scrutiny. We all admit that congestion of the arteries of travel has become so grave and the resultant cost in time and money so great that something must be done. Much deeper concern should be disclosed, however, in the rapidly growing mortality caused by motor vehicles engaged in metropolitan service.

The records of the insurance companies, exceptionally well kept and, on the whole, fairly typical, are very enlightening on this point. They indicate that the number of fatal accidents caused by motor vehicles is increasing at a higher rate than the number of vehicles in use, consideration being given exclusively to cities, where automobile accidents are heavily concentrated and where the use of such machines is greatest. The experience of one of the largest underwriters also shows that the number of deaths caused by motor vehicles has increased from 2.3 in 1911 to 10.6 in 1919 out of every 100,000 insured. Fur-

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ther, the number of fatal automobile accidents in the Registration Area of the United States has increased from 516 in 1911 to 7,525 in 1918, or at the rate of 1,358 per centum, while the number of motor vehicles in use has increased from 552,063 in 1911 to 5,804,031 in 1918, or at the rate of only 951 per centum.

Traffic regulations have become increasingly strict and complicated, the police have become more vigilant and the public more indignant, but the situation has not been altered except for the worse. When the widest publicity is given to the facts available, we can not expect that the great mass of people will remain long indifferent to a state of affairs that is increasingly productive of misery and despair, and not much comfort will be derived from the knowledge that the record for 1919 does not show quite as great an increase over its predecessor as previous years. Automobile fatalities are exacting a heavier toll than either typhoid fever or suicide, and more than half of its penalties are placed on children under 15 years of age, among whom they are almost twice as deadly as any other cause of child mortality. Most of the accidents occur to the victims while they are at play, and a very large number of them are due to motor trucks.

Apart from the humanitarian considerations, which require no extended emphasis, this condition has its reactionary effect on the motor idea. Not only are the rates of insurance for personal liability kept very high, but they may go still higher, and this is an important item of fixed expense in the administration of large fleets of motor trucks. There is also the danger that, in an attempt to remedy the situation through hastily enacted drastic legislation, much harm may be done in retarding the otherwise wholesome and rapid development of the automotive industries through seemingly necessary restrictions. The industry will serve its own interests best, we believe, by giving this problem its closest attention and by lending meanwhile its encouragement and support to all movements, such as the segregation of traffic, playgrounds for children, etc., which are calculated to reduce the number of automobile casualities.

Aid for Railways

IN SPITE of all subtle attempts to delude the public through sanguine newspaper publicity, the railway traffic situation continues deplorable and offers no hopeful outlook for a long time to come. The actual shortage of rolling stock is greater than ever, and the facilities for handling what traffic exists are all but demoralized through the migration of labor from the field of transport to other more lucrative pursuits. The natural confusion which followed the return of the railroads to their owners has only complicated conditions, and the psychological relief that such a procedure should have produced has proved ineffectual in offsetting the war-born discouragement.

Now comes Director-General Hines with the belated explanation that "the public must be prepared for unsatisfactory service," and that this service "is, and promises to continue for some months to be, less satisfactory than was rendered during federal control." This, he says, is only to be expected "with an enormous volume of business being offered for transportation, with a long suspension of the normal increase in facilities and equipment, with continued hesitation in making beginnings in that direction, and with a breaking off, to a considerable extent, of unified practices which prevailed during federal control." The cost of additional equipment, we are told, will amount to "perhaps $600,000,000 a year. In addition, there is on nearly all railroads need for great enlargements of terminals, modernization of shops and engine-houses and construction of additional facilities. There are demands also for additional trackage, construction of heavier bridges to admit of the use of heavier power, the reduction of grades and curves, and the installation of safety devices and other remedial construction."

Into this breach we are fortunate enough to be able to place the motor truck, which is able, within certain limitations and to a degree determined by its numbers, to relieve to a very considerable extent the great strain which must rest for several years on the railways of the country. Millions of tons of freight have been diverted from the rails to the highways, yet motor transport over long distances is but in its infancy. Its economy may not be pronounced or even visible, but the moment demands not economy but transport. The motor truck is the only commercial tool capable of mitigating the abnormal conditions which exist. The unrivalled flexiblity of the motor truck makes it in every sense a self-sustaining haulage unit. It can haul cargoes of all kinds for its owners, for others, even for itself. It is carrying its own fuel, it is carrying the raw materials and finished parts of which its companion vehicles are built, and it is driving itself from the place of its manufacture to the point of its application and use. The motor trucks of this country have a potential cargo capacity equal to that of 25,000 ordinary freight cars, or one-eighth of the present deficiency. They have a potential travel capacity equal to 20,000,000,000 miles per annum and a potential speed capacity in excess of that of ordinary railway freight trains.

Of course, no one is so foolish as to anticipate that motor trucks will rescue the railroads from their embarrassment, but it is perfectly clear that business must place greater reliance on motor transport and must adjust its practices to provide for the shipment by motor of an ever-increasing share of its product. The use of machines for the carriage of raw materials and finished product to and from factories and for the haulage of commodities from factory or warehouse to dealer and consumer is already common, but the practice should be developed in every feasible way. The purchase of motor trucks for high-activity hauling should be encouraged, even to the extent of discriminating against the use of motors for inefficient local delivery. It is, indeed, well worth considering whether the industry supplying such a highly utile and essential machine as the motor truck would not, in view of the extent by which demand exceeds supply and for the purpose of conserving general business interests, be justified in establishing a uniform system of preferential deliveries in favor of those industries which are most essential to national commercial stability and whose continued activity is most seriously jeopardized by the failure of railway traffic. The motor truck industry is the only one which has any marked capacity for giving real help to a country menaced by an impending collapse of its railway facilities.

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Profitable Side Line For Salesmen

Salesmen who call upon dealers, fleet owners, transportation managers, factory engineers, garages, parts and accessory makers—all who are actively interested in the sale, application, production, equipment or repair of motor trucks — can make from $5.00 to $10.00 a day by exhibiting and explaining the use of a well advertised article which almost sells at sight.

A ten-minute talk will effect a sale.

Commissions only, payable immediately or upon completion of transaction. Sample will be furnished free.

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All replies to this advertisement will be treated in strict confidence. Applicants must state their present trade connection.

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Trailer Business Increases

(*Continued from page 17.*)

also entering the field with plans for considerable production. No doubt is entertained that the future of the trailer industry is assured.

The factories are behind on orders from four to six weeks and in some cases from $200,000 to $300,000, because of inability to secure deliveries of axles, springs, bearings, castings, forgings, and even bolts and other small hardware. Severe winter storms, freight embargoes and the recent railroad strike have prevented or greatly interfered with shipments of finished trailers during the winter and early spring. Despite these handicaps, shipments have increased each month, and as shipping approaches normal again, the production will rise proportionately.

Buying is distributed all over the country and in foreign countries. Most of the companies report numerous export sales, to Europe, South America, Africa and the East Indies. The Texas and Louisiana oil fields are taking large shipments of pipe trailers, the Southeastern States are buying many logging trailers and the Pacific Coast is an active market for all types of commercial hauling, logging, etc. Municipalities and contractors in the East, South, Central and Western States are taking large numbers of slow-speed, bottom dump trailers for road construction work and high-speed, side-dump, drop-frame trailers for ash and garbage removal. There is also a steady demand among farmers and small merchants for the light, two-wheel trailer for use with passenger automobiles. Even the camping trailer manufacturers are behind on orders and two or three companies are preparing to put new camp trailers on the market this spring.

Trucks Denied Well-Earned "Velvet" Placed Back on Company's Books

Motor trucks deliver Flex-A-Tile roofing material from the Chicago factory to all points within a radius of 40 miles, quicker and cheaper than the railroads can do it; and this better service pleases customers and has been a big factor in the rapid expansion of the business. Materials delivered right at the customers' doors or at the building jobs with no claims for lost or damaged goods have meant less trouble and bother for the company as well as for its customers.

Although three of these solid old freighters have passed the 5-year mark, every one of the four works hard and steadily, carrying from 8 to 15 tons from 25 to 100 miles a day. Repair charges have been very low because the machines are sturdy and so simply constructed that the company's mechanic, along with his other duties can easily replace worn parts and labor expense. Depreciation couldn't very well be any lower than it is found here, for after charging off 20 per cent a year for the first five years, the company has 3 of its motor trucks "running on velvet." The appraisers recently set a value of well over $1,000 apiece on these same motor trucks and they were put back on the books.

Congressional Champions Begin Actual Road Work

LAW MAKERS WELL ALONG IN TRAINING

WASHINGTON, D. C., May 23.—With the long-pending railroad legislation out of the way and with a legislative program completed with the object of establishing a permanent merchant marine, congress has at last seriously turned attention to the third in the trinity of transportation problems, namely, that of a national policy with respect to public highways. It may as well be stated forthwith that the final enactment of legislation that will give the country a definite, consistent, enduring policy on road construction and upkeep can not be expected at this session of congress, but the significant fact is that a beginning has been made for the evolution of the ultimate national policy.

A majority of the motor truck tradesmen who have been appraised of the inauguration of the hearings that have just started before the Committee on Post Offices and Post Roads of the senate have evidently gained the impression that the subject of these hearings is the Townsend Bill. This impression is natural because the Townsend Bill, designed to authorize the institution of a national highway system under the direction and jurisdiction of a Federal Highway Commission, has received so much attention and has been formally endorsed by so many organizations in the automotive field that it is not to be wondered at if the impression gained currency in trade circles that this was the only public proposal on the subject worthy of notice.

As a matter of fact there are pending in the senate several national highway bills, each sponsored by influential members, and it is to consider not one but all of these bills, to develop, in short, a congressional conscience with respect to national obligations and responsibilities as regards highway establishment and maintenance that the comprehensive hearings have been planned. The six or seven pending bills on the general subject, including, of course, the Townsend bill, will be considered in conjunction. And, if the usual procedure is followed the outcome will be the recommendation of a bill that will probably be a composite embracing the best features of the several bills.

The vital issue at stake is whether there shall be a continuance after 1921 of the present policy of federal aid in road building and maintenance, and whether, in the event that the present team work between the national government and the states is to continue, the distribution of contributions from the national treasury shall be on the same basis as at present. A powerful contingent in congress favors the devotion of increased funds to this coöperative road building, and one of the bills, now under consideration, that of which Senator Phipps is the author, proposes an increase of appropriations, although the funds would be apportioned somewhat differently than at present.

Among the authorities who have already appeared at Washington to advise the senators who have taken up the task of formulating a permanent highway policy there may be mentioned M. O. Eldridge, Director of Road Activities of the American Automobile Association; George C. Diehl of Buffalo, highway engineer. Henry G. Shirley, road engineer, of Baltimore; Lincoln Tyler, of the New York Rotary Club, and Bennehan Cameron, vice president of the Southern National Highway Association. Chief spokesman to date for the motor truck industry is George Graham of the Pierce-Arrow Company, who has appeared as a member of the highway and motor truck committees of the National Automobile Chamber of Commerce, and who has been called upon to answer many questions covering the routes and types of roads needed to acommodate modern motor truck traffic. To the infinite satisfaction of the motor truck interests, virtually all the authorities who have appeared before the senate committee, not excepting A. M. Loomis, who, as representative of the National Grange, has voiced the needs of the farmers, have expressed themselves forcibly as in favor of the construction of the best and most enduring types of highways that can be devised.

Cuts Profits on American Trucks in Norway to 15 Per Centum

The Norwegian Price Control Commission has issued regulations covering the sale of motor vehicles limiting the profits of dealers in foreign cars to 15 per centum on the first 10,000 crowns (crown = $0.268 at par of exchange), 12½ per centum on the next 5,000 crowns, and 7½ per centum on any amount above 15,000 crowns. The percentage of profit is based on the actual cost of motor vehicles laid down in Norway, including cost, freight, insurance and duty.

Prior to the war dealers were accustomed to figure on a profit of approximately 50 per centum, but about a year ago the commission fixed 33 1-3 per centum as the maximum profit.

The Automobile Association of Norway is composed of some 20 dealers in different parts of the country. There are about 10 dealers not connected with the association. The body was brought into existence during the war in connection with the difficulties growing out of the blockade and the restrictions related thereto.

It is pointed out by the association that the present price regulations will seriously affect the handling of the better types of passenger vehicles and motor trucks of American manufacture. An agent of an important American plant states that he has under order for delivery during the spring and summer 500 passenger cars and 100 motor trucks, but that he may have to cancel the entire order and take up the handling of other lines, as the profits allowed by the regulations do not give a margin sufficient to cover time, experience, capital and risks of trade.

The London "growler" types of horse-drawn cab-drivers are fast disappearing from the streets of the English metropolis, due to popularity of taxicabs.

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Road Contractor Finds Ideal Unit in 1-Tonner

EQUIPMENT CONSISTS OF 37 LIGHT TRUCKS

The following is a brief outline of the experience of the Henry W. Horst Company, of Vandalia, Illinois, in road contracting, which has led this company to change from heavy motor trucks to light 1-ton motor trucks.

"The present contract on which we are working," writes an official of the company, "is located in Fayette County, Illinois, and the improved road is a part of the Old National Trail. The roads over which traffic moves are somewhat hilly and involve grades from 3 to 15 per centum. The nature of the soil from which these roads are made varies from black loam to a sandy clay.

"The materials in the early start of this job were hauled by means of 2-ton motor trucks. The continual travel of heavy motor trucks with heavy loads over the roads began to develop deep ruts in the road bed. The resulting action of these ruts on the machines was such as to cause continual breaking of springs and other mechanical parts. It became necessary to hold constantly in the repair pits from two to six of our heavy motor trucks and the delay thus made necessary proved very expensive as far as our hauling costs were concerned.

"The problem of hauling by motor truck was carefully studied and it became evident that some method of hauling would have to be adopted which would eliminate a large part of the grief which we were encountering. We eventually hit upon the idea of using light 1-ton machines with dump bodies, thirty-seven of which have been purchased to meet our present needs. Our reasons for feeling that these light motor trucks would make good were based upon the following facts:

"1. Inasmuch as our roads would not support the wear and tear of heavy traffic the thing to do was to place upon these roads a form of traffic which could be carried by the roads. A 1-ton motor truck equipped with pneumatic tires, both front and rear, seemed to meet this condition absolutely.

"2. A light 1-ton motor truck with its proportionate load was found to weigh considerably less than the empty 2-ton motor trucks which we have previously used.

"3. The mechanical parts of the 1-ton machine could easily be obtained at the various supply houses without any undue delay, and at minimum costs. Our experience with the heavier machines, as far as the spare parts were concerned, was decidedly disappointing, due to innumerable delays which occurred in securing the various parts needed to put this type of motor truck in running order. This difficulty has been entirely eliminated in our present layout by installing a stock room of our own on the job containing all the spare parts necessary to the up-keep of our 1-tonners. This stock room is maintained regularly in such a manner as to have plenty of reserve parts in storage.

"4. It was found that better drivers could be secured for operating the light machines than for motor trucks of the heavier type.

"5. A greater mileage can be covered by the 1-tonners than by the heavier motor trucks of the 2-ton variety. Fifty miles was considered a pretty fair average day's work for the 2-ton motor truck, and we are now averaging from eighty to a hundred miles with the 1-ton machine.

"6. The light motor trucks operate on a subgrade much sooner after a heavy rain than machines of a heavier nature.

"We are operating our machines with two different types of loads; one method contains a dry proportioned batch, including sand, stone and cement; and the other includes a wet proportioned batch, including sand, stone, cement and water, already mixed, and prepared to go directly into the pavement..

"As far as the actual difficulties of hauling are concerned the motor truck operates as efficiently on one method as on the other. Our experience with these light motor trucks is still in its infancy, but sufficient action has been secured in order to convince us that the light 1-ton motor truck equipped with pneumatic tires is the proper solution of our present hauling problems. Where our difficulties used to be in having sufficient material hauled on to the road, our problem now seems to be one of disposing of material as fast as it is hauled on to the road."

Hudson River Tube for Trucks Will Guarantee Food to Gotham

The strike of the towboat men in New York made it apparent that the Hudson River tube for motor vehicle use only is an immediae requirement, and that its construction can not be begun a moment too soon.

The tunnel is now being designed, which is to make New York and New Jersey one by land, and when once built, the services of a great portion of the New York towboat fleet will be rendered superfluous, and it will never be possible again for such a small body of men to threaten the population of an entire metropolis with starvation.

The tunnel will mark another great stride forward in the development of the motor truck industry. Motor trucks ferrying back and forth under the bed of the Hudson will make New Yorkers independent of striking towboat men, and will assure the largest city of an adequate food supply at all times. A strike by a small body of men could not demoralize service, as motor trucks do not require licensed mariners to operate them, and in case of labor troubles corps of drivers to keep the city victualed could be readily recruited. The very lively competition existing between the various trucking companies and individuals will also insure a very high standard of service, and valuable time, now lost by motor trucks standing in line, waiting their turn at the ferries, will be saved.

Motor Convoy Will Cross Country on Bankhead Route

GOVERNMENT TO STUDY TRANSPORTATION

Plans have been completed whereby the War Department will send a motor convoy from Washington to Los Angeles over the Bankhead National Highway on or about June 15, due to arrive at Los Angeles September 1.

The convoy will be under the supervision of the Motor Transport Corps and will consist of a motor transport unit complete, at war strength, one service park unit, at war strength, detachment from Engineer Corps, and detachment from Medical Corps. All ginia, North and South Carolina, Georgia, Alabama, Mississippi, Tennessee, Arkansas, Texas, New Mexico, Arizona and California, ending at Los Angeles.

The purpose of this and other overland trips will be to study the handicaps which surround the transportation needs of the army on account of the lack of dependable and definite systems of highways; to secure data relative to the use of various types of motor vehicles; to secure relative data on solid and pneumatic tires; to train officers and men in extended field operations and to recruit personnel for the various branches of the army.

The Federal Highway Council feels that such study by the Motor Transport Corps will be of great value to the entire country because it will thoroughly establish the necessity of the federal government undertaking the construction and maintenance of a definite system of national highways.

One Truck Out-Hauls and Out-Saves Seven Teams In Road Contracting

An interesting comparison has been made in a recent number of the Oklahoma Highway Bulletin, with regard to teams versus motor trucks in the hauling of road building materials.

A road contractor while doing state aid road work of hauling crushed stone, employed seven teams, seven drivers, and one 3½-ton motor truck. The seven teams had each hauled three loads of 1½ yards per day, a total of 4½ yards daily. By motor truck he hauled 33 yards each day. Figuring the cost of each team and driver at $7.25, the total amount was $50.75 per day for seven teams. The 3½-ton motor truck actually hauled more material each day than the seven teams. The operating expenses of the motor truck figured to $18.40 per day, thereby effecting a daily saving of $32.35. The distance of the haul was 4½ miles each day, or a total of nine miles.

Timken Opens New Sales Office

The Timken-Detroit Axle Company announces the opening of an eastern sales office in the Post-Standard Building, Syracuse, New York, which will be in charge of Gordon H. Gannett and L. S. Wiggin.

After May 3, the address of the Chicago sales office of the Timken-Detroit Axle Company will be 1403-5 Conway Building.

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This Trinity: Water-, Rail- and Highway

By GEORGE M. GRAHAM
General Sales Manager, Pierce-Arrow Motor Car Company

THE advocates of highway traffic are proud to plead their cause from the same platform as their elder brothers in transportation, the railways and the merchant marine. We have no thought to be their rivals. It is our aspiration to supplement them in a transportation trinity as suggested by former Secretary of Commerce Redfield. The relation of all three factors in respect to production would seem to be definitely established.

First—Our waterways are determined by nature's laws. For transportation with the outer world the merchant marine is supreme. Our ships also ply our inland waterways.

Second—The steel rail has ever been the herald of development, but locomotives and cars can not travel beyond its bounds. Experience has shown that the profitable operation of the railroad is largely a matter of bulk shipment over extended distances.

Third—The highways offer an infinite possibility of communication with points not to be reached by railway or ship.

Increasing production rests largely on the development of highway transportation. Motor trucks properly applied can aid the railways in the immense task of serving 105 million persons, spread out over 3,000,000 square miles. We have never simultaneously used all three kinds of transportation to top efficiency. The highway directly touches the home life of more people than all other transportation mediums combined. A scientific and well executed diversion of product to the highways means enhanced comfort, happiness and morale for all our people.

AS WE sense production, there are four main kinds, which I range in the order of their importance: Food, fuel, raw material and manufactured product.

All four kinds of production depend on consumption, and the connecting link between the two is transportation. Wherever we can more closely link up the point of production with the point of consumption we assure increased output. We saw during the war in congestion of railway facilities the deadly results of interrupted distribution. Only lack of material, machinery or labor is a more deadly foe to production than a dearth of facilities to move it.

Delayed distribution works a twofold hardship. This was demonstrated in the recent switchmen's strike. While the consumer waits for the products he suffers inconvenience, money loss and in some cases jeopardy of health and life. The manufacturer who can not ship is equally distressed. His inventory piles up. He is frenzied to find storage facilities. He lacks capital to run his business and keep his labor employed. He hesitates to turn out more product lest he aggravate his problem. So production lags and prices mount. Economists agree that production is the remedy for most of our present ills. It is the answer to high prices. It is the panacea for labor disputes. It is the medium of mercy to Europe. Production now moves over the United States by the following mediums: 15,000 miles of canals and inland waterways, 259,000 miles of railways and 2,753,334 miles of highways.

The first two mediums are at present overtaxed. The highways alone offer expansion. In discharging its distribution function the highway presents potentials not generally understood. The total of surfaced roads in the United States is greater than the railroad mileage, being 296,290, 12 per centum of the total of 2,753,624 miles of possible road against 259,000 miles of railroad.

IT IS estimated that on the Great Lakes and Mississippi in 1918 90,000,000 tons of freight were carried. In the same year 1,200,000,000 tons were moved by motor truck and 2,504,000,000 by rail. Much of this motor truck tonnage is haulage to railroad freight stations. Highways have fallen short of carrying their share because it is only within the last decade that a proper medium has been developed. The man-drawn, ox-drawn, or horse-drawn vehicle, used for fifty centuries, had too limited a range. Highways could not render their service to the public until inventive genius, manufacturing skill and financial enterprise produced what we know as the motor truck. Neither should it be forgotten that the passenger car must be considered in respect to all questions involving transportation over the highways. The utility use of the motor car has won for it a place as a staple commodity. It is essentially a transportation medium. The only difference between the motor truck and the car is that the motor truck transports freight and the passenger car transports persons. The difference between the passenger car and the railroad car is that the latter transports persons in numbers, whereas the former furnishes a quicker individual transportation of infinite convenience and benefit.

Many elements have combined to prevent the rapid application of the motor truck to highway transportation. We have frequently been hampered by ill-considered and in some cases unjust legislation. Our development has been retarded by bad roads. But the greatest obstacle to the expanding use of motor trucks is our failure to work out our proper relationship to the railroads, which must always largely control transportation method in the United States.

We believe that the good-will of railway officials to highway transportation is near at hand. It will be recalled that C. A. Morse, of the Railroad Administration, has said:

"Considered as a unit, practically none of the small branch railway lines feeding trunk lines pay expenses. The traffic gathered by them is turned over to the *main* line with a deficit attached, which has to be overcome during the main line movement before any profit is made. It would be a decided advantage if this traffic would be delivered to the trunk line by means of motor truck."

R. C. Wright, general traffic manager of the Pennsylvania Railroad, has stated that there is small advantage in handling L. C. L. freight up to forty miles. During the war Director Hines urged that wherever possible freight should be diverted to motor trucks, in order to lessen the congestion of railroad facilities.

The old idea that prosperity in the railroad business was to be defined alone in terms of tonnage is passing. We are all learning that volume of business does not in itself assure profits. Formerly the railroad in its capacity as a public carrier was not in a position to refuse unprofitable freight. No other medium was available to have it.

TEMPORARILY our railroads have reached the limit of their capacity. They can have no greater volume. Railway Age says they are 712,400 freight cars short, and only 300,000 can be built yearly. There is an estimated shortage of 50 per centum on locomotives. Five years is suggested as the minimum time in which railroad facilities can be brought to normal. Meantime is it not sound logic that present railroad equipment should be limited to profitable work, leaving the short haul, L. C. L., to other mediums? No rational person considers the motor truck a rival of the railroads in long-haul traffic. In occasional emergency service it has performed wonders, but the labor factor eliminates it for long-distance work. A modern freight train will move 3,000 tons with a crew of six men. To move the same tonnage by motor truck would call for 600 5-ton motor trucks, at least 600 drivers and possibly 600 helpers.

That there may be wisdom in a rearrangement of our present methods is suggested by a brief analysis of the short-haul steam railways of the United States. This class I have limited to railroads having a maximum trackage of 100 miles, although many lines with more than this mileage render a short-haul service.

The figures were obtained from the Short Line Association, and are accurate as of April 1. They show that 659 roads have 100 miles or less trackage. Their total mileage is 16,860, an average of 25.6 miles per road. Their total number of locomotives is 2,491, an average of 4 loco-

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motives per road; 133 roads have but one locomotive; 186 roads are less than 10 miles in length, their average being 6.4 miles; 419 roads are less than 25 miles, their average being 12.6 miles. A foremost railroad authority has frankly conceded that no longer will such lines be constructed either as individual lines or branches of trunk lines. The future tendency will be to substitute other agencies.

The great strain in our modern transportation systems is to be found at the terminals. Freight cars move on an average of only 25 miles per day. We also have the spectacle of something like 2,400,000 freight cars with an average capacity of 50 tons carrying seldom as an average more than 32 tons in carload lot shipments and 7 tons in L. C. L. shipments. If we could, by abolishing terminal delays, make the daily average mileage 37½ miles per car, there would be a 50 per centum increase in efficiency, a possible equivalent of an addition of 1,200,000 cars.

THE entire transportation industry in the United States is studying with interest the achievement of Cincinnati which was recently impressively presented in POWER WAGON. Here railway terminals are bunched, yet owing to trackage congestion, an average of two days and fourteen hours was required to move freight a few miles from station to station, providing that freight cars be used. Now this work is being performed by fifteen 5-ton motor trucks, which not only transfer freight from terminal to terminal, but bring it in from the suburbs. The motor truck taps the suburbs, and has the freight at the terminals in ample time for daily shipment, saving anywhere from one to four days. Every freight house has standard motor truck bodies which attach to the chassis.

When the railroad car comes in, the freight is quickly snatched from it and alotted to bodies for the various stations. Only five minutes is consumed in taking off one filled body and putting on another. The hauling from station to station that used to average two days and fourteen hours is now accomplished in fourteen minutes. The service releases in a year 66,000 box cars from trap work for profitable distance haulage. The cost is $0.80 per ton as against from $1.20 to $1.60 by previous methods. Solve the terminal question, and you solve extravagant costs as well as time lost.

Ten thousand motor truck haulage lines are registered with the National Automoblie Chamber of Commerce by corporations or firms. This organization estimates that there are another 30,000 lines being operated by individuals, who own and drive the motor trucks. Several of the corporations have made investments ranging from $1,000,000 to more than $2 000,000.

We believe to prove our ability to facilitate delivery is to establish our helpful relationship to production. We should therefore like specifically to point out some phases of our service in the four main types of production.

Food may well be dealt with first. In the United States 26,000,000 food producers are trying to feed themselves, 74,000,000 additional American citizens, and many Europeans. It is an enormous task. It has been made harder by a waste result from inadequate distribution. No less an authority than Herbert Hoover has said that 50 per centum of farm production in the United States rots on the ground because of inability to get it to market.

Over American highways passes from farms to markets and shipping points a volume and value of food products of astounding dimensions. Agricultural crops, dairy products, poultry, produce and home and dometic animal production reached in 1918 an aggregate of over $21,000,000,000. There were 5,638,000,000 bushels of cereal; 11,818,000 bales of cotton; 309,109,000 bushels of potatoes; 197,360,000 bushels of apples; 6,549,000 tons of sugar beets; 10,500,000,000 pounds of pork; 589,000,000 heads of poultry; 1,921,000,000 dozens of eggs and 8,429,000,000 gallons of milk.

Adequate transportation helps food production by exerting these four principal influences:

1—Gives wider marketing area.

2—Definitely lowers cost of foodstuff without detriment to farmer by saving much of the excess transportation cost.

3—Enables the farmer to avoid driving to town, thereby increasing his producing time on the farm.

4—Assures the prompt arrival of perishable items at the door of the consumer when they are in best condition and command the highest prices.

THERE are no less than 3,000 regularly established rural motor express lines, and development that originated with the Highway Transportation Committee, when, during the war, that organization was straining every effort to aid in the distribution of food. United States Senator Arthur Capper of Kansas points out that the motor truck is essential to the development of the agricultural interests of America, and shows $70,000,000,000 to be invested in farms—a sum equal to the total of any three other industries that might be named.

The great increase in production possible to the introduction of motor trucks in farm haulage has hardly yet been fairly launched. There are in the United States 6,361,502 farms of 140 acres. Any of these could find use for a motor truck. If only one-third should apply them within the next five years, there will be 2,120,500 motor vehicles assisting the farmer to turn out and distribute at lower cost more food product.

Not only is good production stimulated by motor truck haulage from the farms, but mention should properly be made to the help rendered by motor trucks to plants which mill, preserve, produce, refine, refrigerate, retail and store various food products. These are properly related to the great general scheme of production and distribution.

The constant possibility of a tie-up of American railroads gives valuable interest to what happened during the English strike. The great problem was to feed London, as it would be in this country to feed New York and the other large cities. London is a port of heavy tonnage, the entering place for large quantities of supplies from the continent, and on the land side easily approached by main roads from all directions. The difficulties were limited to two days, and after the third day motor trucks were able to maintain adequate food distribution at all times. The service rendered to food production is equally valuable as applied to the transportation to fuels of various kinds.

It is true that coal and oil are not transported distances by motor trucks. This is essentially a railroad function in cars especially built for the purpose, but, nevertheless, in many stages of fuel distribution the highways play a most important part. The great oil refining companies are without exception very considerable users of motor trucks. Motor trucks are being used in the transport of all kinds of raw material. They are used in mining carborundum, copper, graphite, gold, lead, manganese, mercury, phosphate, salt, silver, sulphur and zinc. Many coal mines in this country have no railroad sidings. Coal and mine supplies must be moved by vehicle, and in many cases the motor truck has been adopted. Similarly 75 per centum of the 2,400 copper, lead and zinc mines extensively employ motor trucks. Retail coal distribution is very largely made by means of motor trucks, and it is thus possible to serve many manufacturing plants not directly located on railroad spurs. Raw material depends largely on trucks for distribution. Gravel, leather, lumber, paper and sand are all very largely handled and distributed by motor trucks. Immense lumber sections in the Northwest are being reached by trucks, which otherwise would be out of reach.

BUT it is especially in its relation to manufactured articles that the motor truck justifies itself as an adjunct to production.

The whole record of production of war supplies is filled with instances where motor trucks discharged functions of this kind and kept going plants that otherwise would have idled. The motor truck has a varied relation to manufactured product. It can discharge many functions. Its service begins when a building from which will issue production is being erected. It hauls away the dirt from the excavations, brings in materials for construction, delivers the raw material, and finally completes its record of performance by carrying the finished articles to the point of delivery. Immense excavations such as those now in progress in Detroit have come exclusively to be a function of 5-ton dump trucks. Horse and cart have been eliminated as hopelessly slow. There is virtually not a single item of manufactured product that in some stage of its transit from the point of fabrication to the place of final application or consumption does not depend on the highways and motor trucks for rapid movement. To attempt to present even a limited record of the services so rendered would be to extend this presentation unduly.

If it be conceded that there is a place for both the railways and the motor trucks, it then becomes an obligation to suggest the three main ways by which they may aid to this result. They are as follows:

1—To enlist the coöperation of railroad and motor truck men, so that each unit

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may discharge its true function in transportation.

2—To protect the motor truck against excess taxation and unfair, ill-advised and restrictive legislation.

3—To bring about the development of an efficient system of highways under federal direction.

The greatest problem which faces the nation is the coördination of all road building into a national system which will scientifically assure a comprehensive system of highways under national control. The United States Chamber of Commerce in a resolution passed at St. Louis is already committed to such a program. We believe that our hopes in this direction will be best served in the passage of the Townsend bill now before the Senate of the United States.

This bill calls for a national system of highways to be built and maintained by the federal government under the supervision of the Federal Highway Commission. It involves a national expenditure of $425,000,000 to be spread over five years.

To those who argue that in the present financial condition of the country, with taxes mounting high, money lacks for such a comprehensive construction—let us concede that economy is a right principle, but equally may it be said that economy should not be pressed to a point where it defeats investments necessary to prevent loss.

The high cost of living is no myth. Neither is the mud road. The prime reason for high costs is inability to deliver maximum production at prices permitting a profit to the farmer and a saving to the consumer. Waste due to unimproved roads is already estimated by figures developed in a congressional investigation to reach the appalling sum of more than $500,000,000 per year.

More than forty-five states will hold regular sessions of their legislatures next year. The number of motor vehicle bills will number at least 3,200. Business men should help the lawmakers to realize that the motor vehicle is to the public an economic asset, not an economic liability, so that out of this deluge of bills only those may be enacted into law which are fair and beneficial to the motor vehicle and the general public.

We want a wealthier, better, happier country; those who, with adequate administrative or legislative help, have been striving to solve the problem surviving from the war could do no better than to direct their efforts to the nation's transportation.

There is offered here the formula of harmony.

The merchant marine shall carry out international, coastwise, river, lake and canal trade, the railroad shall girdle the country for transcontinental service, the highways through the motor truck shall perform a local function. The union of the three in efficient coöperation affords the remedy by which may be paid the costs of the war, by which may be lifted the burdens of excessive taxation, by which may be spread at lower prices the products of our fruitful country, to the benefit of our entire citizenship and the service of true democracy.

Hendrickson Motor Truck Crane Makes Heaviest of Loading Easy

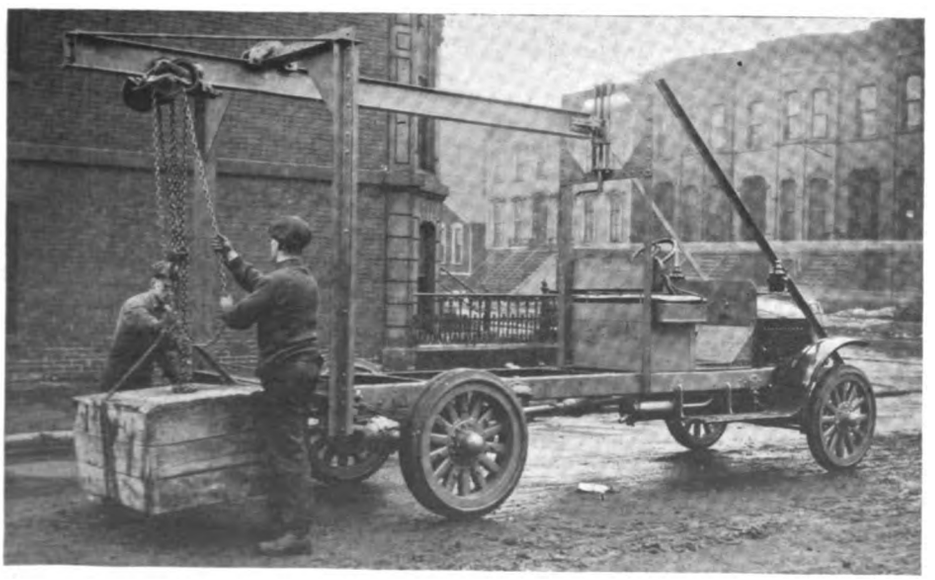
The Master motor truck shown in the accompanying illustration equipped with a Hendrickson truck crane gives an interesting example of the specialized equipment which has been developed for different industries in connection with motor truck transportation.

This device is manufactured by the Hendrickson Truck Crane Company, of Chicago, and is being especially featured and merchandised by the makers of Master motor trucks. The company is making special efforts to bring to the attention of its dealers and customers such devices as the above, believing that the true mission of a motor truck salesman is not merely to sell a motor truck chassis, but to provide wherever possible a complete equipment exactly suited to the buyer's individual needs, and one that is thoroughly practical and profitable for his business.

The crane consists of an arrangement of steel I-beams which can be bolted to any motor truck chassis, and so arranged that the upper part forms a supporting beam for a differential hoist which rolls on it as on a trolley. This upper supporting beam is so constructed that it can be quickly inclined forward or backward by means of an adjusting device at the front end. The load may be locked at any point on the beam by means of a brake on the trolley, and can be easily controlled by one man. The supporting upper beam projects out some six or eight feet to the rear of the motor truck so that a load can easily be rolled out to a shipping platform or on the ground well away from interference with the platform of the machine itself.

In operation, the driver of the motor truck (who can handle the entire work without assistance) merely slings a bridle around the heavy object which is to be loaded. He then by means of the chain-hoist raises the load slightly above the body of the motor truck. The screw adjustment at the forward end is then manipulated so as to slightly lower the forward end and the load pushed forward to its resting place in the platform. The process of unloading is, of course, exactly the reverse. The whole operation is so easy and simple that it takes almost less time than to describe it, and the driver is able to do the work of two or three men.

This device is built in several capacities up to five tons. It is especially valuable in handling heavy, unwieldy objects, such as boilers, large castings, monuments, concrete forms, and the like, or, in fact, anything which is heavy and ordinarily hard to load by hand. By this device, the load can be quickly lifted over fences, out of pits, off the ground, or from a loading platform, and the saving in time and labor makes it a paying investment to any owner who has such loads to handle.



Hendrickson motor crane in operation.

More Business—Less Expense

The Hydrox Company, of Chicago, large distributers of ice cream, has thoroughly proven to its own satisfaction the value of keeping cost records of the motor trucks by which its ice cream is delivered. The company operates a fleet of twenty-four motor trucks, upon which costs are kept on the forms of the National Standard Truck Cost System which have shown how, through the use of motor trucks, its delivery costs have been reduced from $0.0506 to $0.0322 a gallon.

Not only has this reduction of almost two cents a gallon been made on over a million gallons a year, but the territory that the company is able to cover has been materially increased, due to the fact that the motor trucks are able to cover more territory than horses.

The big argument for keeping cost records is not only to show how much money is being spent for delivery but to uncover operations that are inefficient and expensive, thereby enabling them to be corrected.

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Three Trucks, a Team and $6,000,000

Large Annual Output of Rugs and Carpets Easily and Cheaply Hauled Each Year by Small Fleet of Machines in Philadelphia

THREE 2½-ton Pierce-Arrow motor trucks and a team with a wagon of 3,425 pounds' capacity, displacing twelve head of horses and five wagons, are doing their full share in the annual $6,000,000 manufacturing, wholesale and retail rug, carpet and linoleum business of Hardwick & Magee Company, of Philadelphia.

This old established concern has a large mill, four stories and basement, in one of the city's textile manufacturing centers, and a handsome retail store in Market street, in the principal downtown retail district.

Included in the mills' products, in addition to linoleums, are many of the well known carpet and rug weaves. The company does the bulk of its business with department and dry goods stores all over the United States and sells considerable quantities of merchandise to jobbers and private customers.

Considering the size of the business, and the comparatively small number of units in the fleet, their share in doing this business and the strictly economical manner in which the traffic department is conducted, it is amazing to the layman what is accomplished by this transportation equipment. And yet, as frankly acknowledged by officials of the company, it is "not necessary to count the dollars" in the traffic department, for, they say, "we would use motor trucks in our business, no matter what might be the cost."

CLOSE personal attention to actual operating details, and constant supervision, rather than advanced systematic compiling of operating costs appear to be the chief factors here in keeping down expense and at the same time speeding up deliveries so that there is as little lost motion as possible.

The Hardwick & Magee machines are a good advertisement for the house. They are of the open express body type, with roomy, protecting cab having a comfortably upholstered seat and each vehicle is provided with especially made tarpaulin top and roll-curtain sides of the same material. The motor trucks are painted red and bear on their sides, both body and top, the company name and business. The large wagon for the team is provided with canvas top, is used for "pick-ups" and does no retail hauling. This relieves the motor trucks from most of the city short-haul work of a minor nature.

The first of the motor trucks was purchased in July, 1918, and the last one has been owned by the company only a few months.

"We used two horses on long hauls when we had the twelve head," said an official of the company, "but we decided to motorize because we could cover so much more ground in so much less time with motor trucks and because the horses would get sick too often for the highest efficiency in deliveries." He added that one difference could be seen in the fact that for the first fourteen months after motorization, no money whatever was spent for motor truck repairs, whereas in such a period there would be various individual expenses for each horse, with consequent loss of time.

The company's garage, to which is attached the barn, is only a few blocks from the mills. The drivers of the motor trucks —there are no helpers—and the driver of the team report at the garage every morning at 7 o'clock and at the office of the mills fifteen minutes later. Before the men leave the garage, they are personally instructed by one of the officials of the company regarding transportation details for the day. This appearance, at so early an hour of a company official at the garage, has a salutary effect on the employes as to punctuality and general discipline. If there is any "leftover" merchandise to be hauled from the mills to the store in the downtown district, it is usually started on the motor truck's first trip out.

SEMI-FINISHED strips of carpet, in twenty-seven-inch widths, are among the merchandise hauled early from the mills to the store. To receive goods for hauling from mills to destination, the machines back up to a large stepless door cut for this purpose at motor truck platform level in the front of the mill building, and to a large platform in the courtyard in the rear. The material, such as carpets and rugs, unfinished woven goods to be completed at the store, is loaded into the motor trucks to their full capacity on each trip, three such loads being rquired to fill a freight car. The woven material is loaded on the machines in bundles easily handled and not too bulky for quick lifting, as speed is recognized here as an important factor in satisfactory deliveries. Considering that there are only three chauffeurs and one team driver, with no helpers for either, the goods are handled with great despatch. Should the drivers need assistance in loading, or unloading, either at the mill or the store, shipping clerks are called into requisition.

The rugs and carpets that are hauled to the store in sections, are sewed together to form the units of product at the store, where they are then made ready for reshipment to department and dry goods stores, or for sales direct to customers from the retail department of the store. Rolls of completed carpet and rugs are delivered to private customers also by motor truck. Both power wagons and the team may haul rugs, carpets and linoleum to the main, or store building, from the mills and to jobbers, as well as to depots and wharves for freight shipments; but as mentioned, the team never is used for retail trade transportation. When shipping is being done in carload lots, the motor trucks and wagons usually haul the goods, finished at the store, from that building direct to the depots or wharves. For the last few months, however, there has been a departure from this system for emergencies, a certain quantity of merchandise having been shipped direct from the mills to the depots and wharves.

For traffic purposes, the routing is divided into three sections, namely, north, west and south. There is no Philadelphia eastern division, the Delaware river being the barrier in that direction. The chauffeur for the northern section reports only in the morning to the traffic manager's office at the store building, where the goods to be hauled to destination are assembled in special "stations" for each driver to load into his motor truck. The northern section includes: Roxborough, Chestnut Hill, Glenside, Fox Chase and Olney. The western section includes: Chester, Ridley Park, Brookline, Bala-Cynwyd, Haverford and other Main Line points. The southern section takes in South Philadelphia generally, including the wharves and depots, Kensington and across the ferry to Camden, New Jersey. The chauffeur for the western section also reports to the traffic manager but once a day, in the morning, like the northern section driver; but the driver for the southern section reports at the end of the trip in from the mill in the early morning and again at 11 a. m. He usually returns by 3 p. m. There are, however, exceptions to this rule. Two of the motor trucks average fifty miles a day on their runs, but the machine assigned to the bulk of the work within the city limits averages only thirty-five miles.

AS indicated, both delivering from the mills and loading for other destinations are done at the store building, in the rear. A shipping clerk is stationed near the traffic manager's office and each driver's load is carefully assembled, ready to be loaded on the motor truck. There is a large store room for merchandise and on the fifth floor is the department where the unfinished product from the mills is completed for hauling to customers. A large elevator which serves as an adjustable loading and receiving platform, runs between the ground and the fifth floor, operating in an outside shaft opening on the narrow street in the rear of the store. The goods from the fifth floor, to be hauled away, are placed on the stout hand trucks and then run on the elevator, which is lowered to motor truck platform level, or a little above should there be any particularly heavy loads on any of the hand trucks. The hand trucks then are shoved "down hill" onto the motor truck platform. How-

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ever, if the hand truck loads are of the usual weight and dimensions, the elevator is stopped at motor truck platform level and the hand trucks may either be run onto the motor truck platform, or, if the merchandise is light, the rolls of carpet, rugs, or linoleum may simply be lifted by hand from hand truck to motor truck platform.

Occasionally lighter bundles are loaded from the ground, especially if one of the motor trucks is occupying the loading platform with the heavier wares. No more than two machines at a time are allowed to occupy the space directly in the rear of the store, to prevent "jams." When supplies are needed for the factory or store of the company, one of the motor trucks not immediately pressed for work is requisitioned to haul them. When the drivers report to the traffic manager at the store, at the end of the trip in from the mills, each is provided with a route slip.

THIS is a white form with a yellow duplicate. The driver takes the original along and the yellow duplicate is retained by the traffic manager for the company's office. The slip has spaces for entry of date, driver's name, names and addresses of all customers to be called on by that driver; nature of package in each instance, indicated "C. O. D.'s" and report. These slips are made up from shipping slips and checked off. The route slips are checked up when the drivers return from their trips and have turned in their "C. O. D.'s." The shipping slips, which act as guides for loading the motor trucks, in addition to proper assembling of the parcels or bundles for each load, contain name of purchaser, town and state, with street address where there is any. This form is in triplicate, one copy following the goods, one remaining in the book, and the white original being kept in the company office.

For merchandise to be returned, the driver receives a manila tag. It has two stubs, one as a receipt to be given to the customer and the other to be kept as a record in the company office. The main part of the tag is attached to the merchandise.

While the traffic department depends, in the main, on Pierce-Arrow service stations for repairs of any magnitude, thus far there have been few and the drivers and mechanics at the mills are expert enough to attend to all minor repairs and adjustments.

Thus far, the main difficulties have been bolts and nuts shaking loose in transit. Carbureters sometimes have become loosened in this way, so the air has not been mixed properly. For a time, after the first few occurrences, it was found that the motor trucks were making only about four miles to the gallon of gasolene. This is so far below Pierce-Arrow performance that the company investigated. Close examination and tests located the air-mixing trouble from the loosened mechanism and the cars now are kept in such condition through careful, periodic inspection on the part of the drivers, that they are averaging at present about seven miles to the gallon when loaded to capacity.

"We believe in keeping the garage at a uniform temperature during cold weather," said a company official, "not too warm, or too cold. It makes it much easier for the drivers to start their engines when it is thus uniformly warm enough and there is no use in wasting fuel keeping the garage too warm. The evenness of the temperature above a certain point seems to have considerable to do with making the engines easy to start, as well as the actual degree of warmth. The gasolene then flows easier and the mixing is more readily accomplished. This is a point that appears to be usually overlooked."

THE garage is heated by steam, large pipes running throughout from a big boiler, on the return-system plan. Gasolene is purchased 150 gallons at a time and stored in a pit beneath the sidewalk, being pumped from the outside of the building, in the rear. Oil is bought by the barrel for the mill machinery and this, as is the case with grease, is used also for the motor trucks and wagon, the plan saving considerable money in the course of the year.

The oil and grease expense is not charged to the transportation department. The company's own motor trucks haul the lubricant to the garage from the mills when it is needed and the supply never is allowed to run low. The oil is placed in a tank and removed by hand pump and the grease is purchased in twenty-five-pound tins. The oil on each motor truck is changed for every 1,000 miles run, as indicated by the hubodometer and the drained-off oil is saved in special receptacles, strained of grit and dirt and then sprayed over the springs by air gun and used in rubbing parts with waste from the mills. All these economical points are carefully observed and make possible the maintenance of the small fleet for this big business at comparatively low cost.

Agricultural Department Gives Out Some Tractor and Horse Figures

The number of horses displaced by tractors in the corn belt is largely determined by the number it is necessary to keep for corn cultivation, and other work current at the same time which the tractor can not do. This is perhaps, the most important of the facts brought out by an investigation recently made by the United States Department of Agriculture in seven corn-belt states, relative to the influence of tractors on the use of horses.

The department has drawn on the experience of 191 tractor owners, in the preparation of this bulletin, which is designed to enable the corn-belt farmer to answer for himself the following questions:

For what operations can I use the tractor?

In what operations will it displace horses in whole or in part?

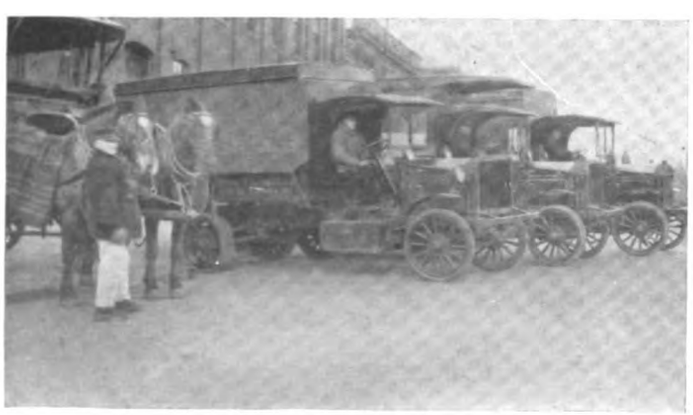
How many horses will it displace on my farm?

It was found that the number of horses disposed of by the farmers in question after buying tractors was between two and three on a farm. The average number of acres tillable by horses was increased 12, and the average size of the farms by a total of 22 acres. Several operators displaced horses entirely on plowing, disking and harrowing. Few operators allowed their horses to stand idle while the tractor was in use.

The horses remaining on these farms are doing 75 per centum of the tractive work, and the tractor the remainder.

The tractors were used for an average of twenty-nine 10-hour days a year on the home farms, no records being taken of custom work. A 3-plow tractor on these farms does the work of 8½ horses in plowing, disking, harrowing and harvesting.

The results of this study further substantiate the conclusion that the principal advantage of a tractor lies in its ability to do heavy work in a shorter time than is possible with horses.



Fleet which successfully handles rugs.

Warehouse from which trucks make records.

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Motor Truck Owners to Meet in Chicago

First Annual Meeting of National Association to Be Held June 25 and 26, Following Two Preliminary Conventions in East

THE first annual meeting of the Motor Truck Owners' Association of North American will be held at Chicago on June 25 and 26. This announcement follows meetings at Philadelphia on April 7 and 8, at which nine states were represented, and another at New York on May 17, at which equally representative motor truck operators were present.

A subject which was avoided at both meetings was the proposed restriction of membership to industrial operators. While this question is by no means dead, its discussion aroused such feeling that Tom Snyder, of Indianapolis, and others back of the new major organization, felt that the issue had best be subordinated to the main business of putting the new body on its feet. While for this reason, the programs at the New York and Philadelphia gatherings were built on a general motor truck platform, there is little doubt but that sooner or later the question of making the Motor Truck Owners' Association of North America exclusively a custom operators' body will come up.

THE men behind the new association believe that the interests of transfermen and shippers are far from identical, but for the time being regarded it as good policy to leave the emphasis off this point. The transferman, it is pointed out, is becoming a dominant factor in the motor truck industry, and associations of transfermen occasionally take action which creates a sensation among motor truck dealers. This fact was emphasized recently when the Hi-Ways Transport Association, of Toledo, Ohio, sent out a letter reading in part as follows:

"To the motor truck dealers of Toledo—Our attention has recently been drawn to a number of cases in Toledo where motor truck sales organizations, through their salesmen, have attempted to make 'deals' with men inexperienced in the cartage of long distance hauling business, on what we would consider anything but a legitimate business basis.

"While it is the effort of the Hi-Ways Transport Association to assist men in the trucking line to bigger and better business, at the same time we also hold a trust in the confidence and good graces of the shippers, by assuring them that any firm or individual who is a member of this organization must be responsible. We therefore can not accept into our organization any man or firm who to-day buys a motor truck for the purpose of going into the trucking business knowing nothing about how to run his business or determine his costs, and who has been brought up to the point of buying a motor truck by flowery tales from a motor truck salesman, misrepresenting the possibilities for profit in this business.

"The main point we have in mind is the case of individuals who have only a small amount of money which the motor truck dealer accepts as a down payment on a motor truck, and advises him to join this association to get business. Such a man, with limited financial backing, is not a good risk either to the dealer or to the cartage business. This is the class of men who often lose their entire investment through inability to meet subsequent notes, or who, in order to meet such obligations, are on the street corners and in the business houses attempting to get business at a price that a responsible cartage man could not accept.

"We can see the matter in no other light than that the motor truck dealers who are doing a business of this kind are the greatest menace to their own interests and to the buyers of motor trucks that the trucking business has to combat.

"Toledo needs responsible motor truck operators, but more, it needs responsible dealers. The trucking business is a legitimate business with a legitimate margin of profit and no more, and the dealers who permit their men to draw beautiful pictures of 'wealth overnight' to a man who has no knowledge of the trucking business, and who has a very limited financial backing, are either ignorant of the business or are deliberately falsifying. Such dealers are doing more to demoralize the trucking business than any other one thing in many problems we are having to fight to put the business on a firm and accredited basis."

THIS letter shows the way the wind is blowing. There are, of course, two sides to the question. Motor truck dealers, it is understood, object to having the transfermen tell them whom to sell motor trucks to, while the transfermen's stand is indicated by their open letter. More or less the same situation prevails in the national organization, but whether the question of dividing the membership, or restricting it to a certain class of owners will come up at the annual meeting is still undecided.

Prior to the New York meeting on May 17, the New York City association conducted a successful membership drive, which ended on May 15. The National Team and Motor Truck Owners' Association was represented at the meeting, while several western organizations also sent delegates.

As indicated, nine states were represented at the Philadelphia conference. The work of the meeting is well indicated by the following resolutions which were adopted:

"FIRST—That it is the consensus of opinion of this conference that a national motor truck transportation association is an absolute need.

"SECOND—That a call be issued by this assembly for a national conference of motor truck men and fleet owners for the purpose of establishing a national organization to secure coöperation among the owners and managers of motor truck hauling and general motor trucks in the United States; to foster and protect the general welfare of their business; to guard its interest as affected by state and federal legislation; to protect it against any oppressive, arbitrary or unjust administration of the traffic laws and regulations; to promote laws for the maintenance of the rights of motor truck transportation; to promote state and federal laws for the maintenance and improvement of highways and to gather and disseminate practical and useful information for the development and promotion of motor truck transportation in all its relations to American industry.

"THIRD—That a committee of fifteen, representing the several sections of the United States, be appointed to meet and perfect the organization and issue a call for a national convention. That this committee be divided into three groups of five each, one on ways and means, with T. D. Pratt, of New York, as chairman; one on organization, with Tom Snyder, of Indianapolis, as chairman, and one on constitution and by-laws, with Edward T. Fleming, of Philadelphia, as chairman."

Akron Watches 'Bus Line

To offset inadequate street car service in Akron, Ohio, which has earned the name of being the fastest growing city in the United States, the Goodrich Tire & Rubber Company will start operation of a 10-car motor 'bus service on June 1. Akron city officials will watch the operation of this line closely with the idea, should it be a financial success, that it may be taken over, more 'buses added and the foundation laid for a municipally-owned transportation system by 'bus—one of the first in the country. City officials go so far as to suggest that no more extensions be made to the existing trolley system, but motor 'bus lines be routed into all outlying sections.

G. M. C. Enlarges for 25,000 Trucks.

Work has been started on additions which will increase the capacity of the General Motors Truck Company to 25,000 motor trucks in 1921. These additions will double the size of the plant, making it more than ten acres, one of the buildings to contain 140,000 square feet of floor space. This is five-sided and will be a machine shop, its dimensions being 357x310x190x345x218 feet. Running along the south side of the property will be a railway siding 1,200 feet long to facilitate the receipt of materials. Surveyors are running levels for smaller buildings including a heating plant on an addition to the main factory that is to be used as a test house.

Federal Truck Company Buys 60 Acres

The Federal Motor Truck Company announces the purchase of a large tract of land to provide for future expansion. The Federal company's new plant will be located three blocks west of Grand River on the Detroit Terminal Railroad. It comprises sixty acres, is inside the city limits and just outside the six-mile circle. This is undoubtedly one of the largest single tracts to be devoted to the manufacture of motor trucks in Detroit, if not in the country, and it will give the Federal Company facilities equal to any future need that may arise from a manufacturing standpoint.

Approximately $16,000 was realized in the recent auction sale of government automobiles, motorcycles and motor trucks at Fort Jay, Governor's Island, New York.

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European Carbureter to Mix in American Affairs

CLAUDEL PLAIN-TUBE DEVICE MADE HERE

The Claudel carbureter, widely used in Europe for twenty years, is now made in America by the Claudel Carbureter Company, Long Island City, New York. This plain-tube mixing device was designed by Charles Henri Claudel, the pioneer in the development of the plain-tube type of carbureter.

The engineers of the Claudel Carbureter Company have Americanized the European model of the Claudel to meet the particular requirements of engineering needs in this country. They have added several features demanded by the American motorist, such as a quick starting device and rapid acceleration with a cold engine.

The automatic functioning of this carbureter is based upon the action of the diffusor jet assembly. This device combines three distinct principles of operation:

First—The orifice or jet which supplies all of the liquid fuel is placed at charge, or below the fuel level, where its flow is proportional to the difference in head.

Second—The diffusor proper is in "shunt" position, that is, enclosed in a chamber with openings at one end to the atmosphere and at the other end to the suction in the carbureter, thereby reducing the effect of the suction on the fuel flow.

Third—Through the nozzle holes in the diffusor head the interior emulsion chamber of the diffusor is placed under the direct action of the vacuum in the carbureter, increasing the discharge as the vacuum is increased.

The combination of these three principles of operation, correctly applied, gives a balanced mixture exactly proportioned for the best results at every engine speed and load.

The Claudel is really a combination of two types of jet, one, the main jet of constant flow per unit of time; the other, a series of nozzle holes, of suction-controlled flow. Fuel from the float chamber flows through the main jet into the diffusor, then through the compensating holes into the reservoir or diffusor bore. It also flows through the idling jet into the idling tube, the level in the three tubes being the same as that in the float chamber.

Air at atmospheric pressure enters the outside base or air tube of the diffusor column, passes up this outer sleeve and over the top of the gasolene guard tube, which prevents the fuel from overflowing. As the throttle is opened gradually and the suction in the diffusor increases, thereby lowering the liquid level in the diffusor bore, a series of air bleed or compensating holes are progressively uncovered. Through these holes the air rushes into the ascending column of gas vapor and out the nozzle holes at the top of the diffusor in a finely broken-up gasolene emulsion. The higher the suction acting upon the diffusor, the lower will be the level of the gasolene within it, and, therefore, more of the compensating holes will be uncovered, permitting a greater dilution of the mixture.

At the higher speeds the diffusor is practically emptied and twenty-one spirally-arranged air-bleed holes are in action. As the gasolene globules are lifted by the suction, they must pass through a barrage of twenty-one air guns shooting at right angles into the ascending fuel. This turbulent mixing effect produces a finely divided fuel emulsion ideal for rapid flame propagation, extreme economy and high power. The diffusor discharge is in approximately the ratio of fifteen parts of air to one part of gasolene by volume. This thorough intermixture of air and gasolene before it enters the carbureter barrel is the Claudel method of breaking up the heavy fuel of to-day for extreme economy.

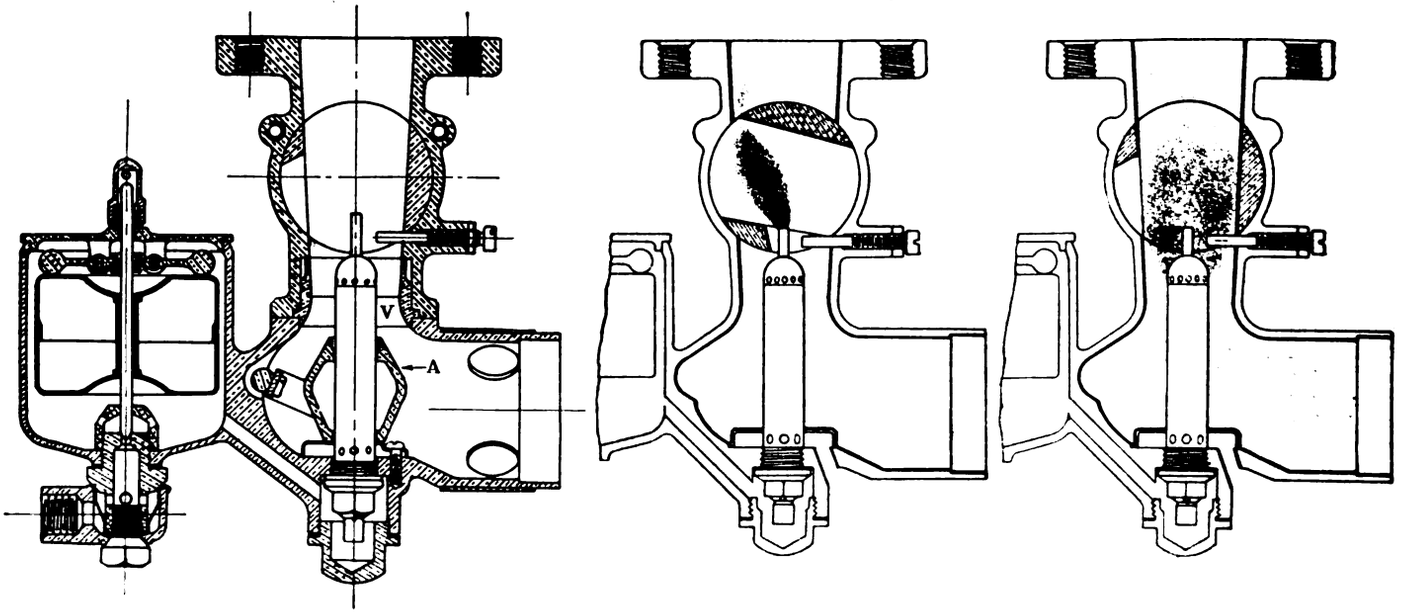
The idling device, Fig. 2, is incorporated in a central tube projecting up into the depression of the barrel throttle, where a strong pull is exerted on the idling jet for low-speed action. The barrel throttle is slotted to pass around the idling jet, and the only adjustment on the carbureter is a screw extending into the air space to partially block off the area of this slot as desired. Screwing it in lessens the air area and enriches the idling mixture. Screwing it out makes the mixture leaner.

In the American type of Claudel shown in Fig. 1, a decided improvement has been incorporated for strangling the air by means of a sliding air cone, controlled from the dash. This device assures quick starting and warming up in cold weather, and absolutely disregards temperature. The streamline air cone, concentric with the diffusor, may be raised into contact with the venturi, shutting off the air supply and putting the full suction on the diffusor. In this position it is only necessary for the cylinders to exhaust the air in the top of the carbureter before the diffusor discharge must commence. This action is instantaneous, as the volume is small.

Referring again to Fig. 1, the sliding cone *A*, in its closed or strangling position, fits snugly into the venturi entry *V*. The streamline shape of the cone centers and steadies the air stream so that it passes the nozzle holes of the diffusor with high velocity and in an even column ideal for the best results. In its lowest position the cone offers no restriction to the maximum performance required and is of benefit in minimizing air intake turbulence.

In warming up a cold engine when a richer mixture is necessary, the cone *A* may be dropped slightly, forming a variable venturi. With the cone in this restricting position one may readily get away while his engine is still cold. Thus, in reality, the Claudel acts as a double carbureter—one of small venturi for normal driving, and, with lowered cone, another of full engine capacity.

The Claudel is a very high-grade carbureting instrument built in a number of standard S. A. E. vertical sizes. A horizontal model will be announced later. Special models, however, for special installations are built to order, including airplane and duplex designs.



Claudel carbureter, Fig. 1—Fig. 2—Fig. 3.

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Federal Reserve Banks Not to Play Favorites in Extending Credit

With respect to the action of the Federal Reserve Board on credits, motor truck makers will be interested in a speech made in Washington, May 18, by W. P. G. Harding, governor of the Federal Reserve Board. On the subject of essential and non-essential loans, Governor Harding said:

"The primary duty of the Federal Reserve Board is to see that the Federal Reserve Banks function normally in the manner prescribed by the Federal Reserve Act. The character of business which may be engaged in by the Federal Reserve Banks is described in Sections 13 and 14 of the Federal Reserve Act, and all regulations of the board bearing upon the loans and investments of the Federal Reserve Banks must be in conformity with the provisions of the law. Regardless of the extent of its legal powers, it would be a most difficult task for the Reserve Board sitting in Washington, to attempt by general rule of country-wide application to distinguish between "essential" and "non-essential" loans. During the war there was a board underlying principle that essentials must be "necessary or contributory to the conduct of the war," but notwithsatnding the sharp outline of this principle much difficulty was experienced by the various war boards in defining essentials and non-essentials. All the more difficult would it be for the Federal Reserve Board to make such a general definition now when there is no longer that purpose as a guide.

"The Federal Reserve Board is not a temporary organization. It is a permanent board, and it must be guided by the terms of the Federal Reserve Act. Section 13, in defining the eligibility of paper for discount by Federal Reserve Banks lays down the general rule that any paper maturing within the time prescribed, and issued or drawn for commercial, agricultural or industrial purposes, or the proceeds of which have been used or are to be used for such purposes, is eligible. No express condition is made regarding the essential or non-essential character of the transaction giving rise to a note which may be offered for discount, and the Federal Reserve Board is not required and properly could not be expected generally to adopt such a criterion of eligibility. It is too much a matter of local conditions and local knowledge to justify at this time any general country-wide ruling by the board even if such a ruling were deemed helpful."

Horses Decrease 85 Per Cent in Lincoln

City statistics of Lincoln, Nebraska, show that since 1913 horse traffic on the streets has decreased nearly 85 per centum and that the increase in vehicles is 319 per centum.

At Omaha the receipts for 1919 for live stock coming to market by motor truck from farms fifty to one hundred miles away almost doubled 1918 receipts.

Since January first, in twelve states, 467 motor vehicle bills have been introduced before legislatures.

The above facts are worthy of consideration, and when it is considered that a billion dollars will be spent in the United States for highway improvements this year, one is aware that the motor vehicle is demanding better streets and roads, and that this is an age of machinery, a commercial world.

Educators Plan Course For Highway Engineers

NATIONAL CONFERENCE RECOGNIZES NEED

At the national conference on the important subject of highway engineering and highway transport engineering education, called in Washington by United States Commissioner of Education Claxton, last month, the following resolutions were adopted:

RESOLVED, That this conference strongly recommends that universities and colleges offer courses in highway transport as their facilities will permit, and that at least ten universities, located in different geographical sections of the United States offer short period advanced courses covering the various phases of highway transport, and four-year courses in highway transport engineering or highway transport options in four-year collegiate or technical courses.

RESOLVED, That we, the representatives of education, industry and government, assembled, in national conference at Washington, D. C., at the call of the Hon. P. P. Claxton, commissioner of education, to discuss this subject and to formulate recommendations concerning it, do hereby concur in the following statements:

That there is no one domestic activity of more vital import to the people of the United States than an efficient and economical administration of our highway program.

That there is a pressing demand for trained men not alone to guide this program but also to undertake the problems of the production and economic use of all vehicles over the highway.

That this need can only be met by increased educational facilities for turning out these men.

That the entire subject is one which should be closely coördinated and a permanent committee made up as hereinafter designated, should be appointed by the Commissioner of Education to consider this problem in its several aspects and to bring about a fuller understanding of it on the part of the people of the country.

That the component parts of this committee should represent the Bureau of Education, the Bureau of Public Roads, the Motor Transport Corps, the State Highway Departments, the automotive industry, and the state or private educational institutions as the groups best equipped to furnish the technical information needed and to work out these great public questions.

N. A. C. C. Service Men Hold Convention at Indianapolis

As its first important effort, the newly created Service Division of the National Automobile Chamber of Commerce held a convention at Indianapolis May 24 to 26. The Service Committee in charge of the division met April 14 at Detroit and decided on the place and date of meeting and adopted a program. The meeting was similar in many respects to the one held at Detroit last November. The latter, however, covered the whole field of service, more or less, and it was proper that it should, since it was the first meeting of its kind in several years, but the Indianapolis meeting confined the topics to a more limited range with the expectation that it would result in more tangible benefit.

The program as laid out treated of the service situation first outside of the service department and then inside. Following are the topics more in detail:

"The Salesman's Functions in and Attitude Toward Service from the Sales Point of View," "The Same from the Service Department's Standpoint," "The Owner's Viewpoint as to His Responsibility and What He Expects in the Way of Service," "The Same as the Service Department Sees It."

The foregoing group of papers on service from without the Service Department occupied the first day and on the second day a group of papers on the internal affairs of the service department was considered as follows:

"Method of Estimating and Charging for Service on a Flat-Rate Basis," "Repair Shop Efficiency Methods," "Stock Room Efficiency Methods," "Service Salesmanship." As time allows other topics will be presented for general discussion without formal presentation through prepared papers.

$100,000,000 In New Ford Company

Formal notice of the proposed reorganization of the Ford Motor Company and other interests of its stockholders was filed in Michigan on April 27. The papers indicated that the automobile and tractor business will be consolidated and reincorporated as a $100,000,000 Delaware corporation.

The corporate powers of the new company will permit it to manufacture aircraft, internal combustion locomotives and railroad cars, and to continue the passenger automobile, motor truck and tractor business now conducted separately.

The capital stock, it is understood, will be held by Henry Ford, Edsel B. Ford and Mrs. Henry Ford.

The $100,000,000 corporation will be formed by the consolidation of companies now having a total capitalization of only $3.000,000. The present capital of the Ford Motor Company is $2,000,000, while that of the Henry Ford and Son Corporation, organized originally for the manufacture of tractors, is $1,000,000.

Plans Ideal Section On Lincoln Highway

The Lincoln Highway Association is planning the immediate construction, at some point on the great transcontinental road, of a section of the ideal type of permanent, efficient and adequate main American highway.

The announcement of the association's definite plan in this respect is of nation-wide interest as marking a distinct advance in the policy of the organization and the beginning of a new era of American highway construction. After seven years of intensive promotional effort and tremendous constructional accomplishment on the Lincoln Highway, the association is undertaking, in accordance with its policy of making the Lincoln Highway in so far as possible "America's Object Lesson Road," to provide at least one point on the ocean-to-ocean route a section of road which will embody the highest ideals of modern American highway construction.

Oneida Increases Capital $7,500,000.

The capital stock of the Oneida Motor Truck Company has been increased to $7.500,000. An issue of $1,000,000 of participating preferred stock was ordered issued at once and has been placed on sale. This increased issue will enable the company to keep up its expansive building program and to increase the manufacture of its own parts. The floor space has been expanded to approximately 200,000 square feet and contracts have been let for several additional units to the plant. The factory site comprises 48 acres. The company was reorganized a little over a year ago and Lafayette Markle placed at its head. All officers and the board of directors were elected to continue in office.

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Milk Delivery by Motor Truck

By JOHN B. WOODS

ONE of the last strongholds of the faithful horse is in the daily delivery of milk in town and city. He has built up a reputation for efficiency and intelligence in this particular task that places him beyond the reach of competition within his proper range. And of course his range is short haul work, where the journey to the point where deliveries begin and from where they end back to stable can be covered in a few minutes. He can travel fast enough to keep two men on the jump, and after he learns the route he always stops at the proper places. Delivery foremen who work for the big milk supply companies claim that a good horse will go out with green men and teach them how to cover the route. He has the common failing of horses in that he must be fed and cared for every day, but on the other hand he does not burn extra gasolene in making so many stops and starts. However, for long haul work, such as distributing to hotels and markets and in the suburbs the horse is being superseded by the faster and more powerful motor truck.

THE District of Columbia, containing the city of Washington, and her numerous suburbs which extend across the line into Maryland and over the Potomac to Virginia, present a considerable problem in distribution to the individuals and companies who supply the half million people with milk for breakfast every morning. Roughly this territory is twelve miles square, with a thickly settled center surrounded by less thoroughly built-up sections which in turn are bounded by populous suburbs. Downtown the people are crowded together in rows of party-wall houses. and this type of building developement also is found farther out in certain sections, while other areas are given over to detached house settlements. In other words the location of consumers is somewhat spotted in widely separated localities.

Probably the most efficiently organized milk supply company is the firm of George M. Oyster, Jr., with laboratories and bottling plant on Connecticut Avenue. During a period of several years this firm has built up a great volume of business, founded upon scientific maintenance of the purity and quality of the products and upon unfailing efficiency in their distribution. The location of the central plant is strategically correct, being near the center of population, yet in a high class district where the surroundings are quiet and clean. And the bulk of the work of transporting the dairy products over the city streets is done with a fleet of motor trucks, numbering thirty-one, and embracing a half dozen of the well known makes.

MILK and dairy products are shipped in from the country every day to four receiving stations. From the receiving stations they are brought to the laboratory by two big motor trucks with box bodies. Both are of 3½-ton capacity, built by the General Motors Company, and both are kept busy throughout every day at this particular job. At the laboratory the products are inspected and the milk is pasteurized and prepared for distribution. The bottling plant is under the personal supervision of a widely known chemist with training and long experience in the handling of dairy products. Shortly after one o'clock at night the long haul motor trucks are loaded and pull out on their delivery routes to the most distant suburbs. From that time on the work is continuous and motor trucks and horse teams are dispatched without confusion. The latter operate only upon the shortest circuits. About seven thousand gallons of milk and four thousand gallons of cream are brought in, prepared and delivered daily, and of this quantity about five thousand gallons of milk and three thousand of cream are transported to customers by gasolene power.

The plant layout is well planned. From the bottling plant in the center of the block, immediately back of the retail sales rooms and in view of anyone who wishes to watch the work, the bottles are taken back to the loading platforms. The cases are handled by conveyors and loaded by gravity. The motor truck garage occupies a large building facing a street parallel to Connecticut Avenue, and adjoining the packing plant. Thus the delivery foreman is always in close touch with the shipping department and there is no confusion or delay in the motor truck supply, such as might occur if the machines were sent to the loading platforms from a distance of several blocks. There is a workshop in connection with the garage and repairs are handled by the company's own men. By making use of the space beside the garage building and an alley it is possible to keep the fleet moving in and out without blocking street traffic.

THERE are three kinds of work handled by the fleet of motor trucks. The big fellows bring in the goods from the collecting stations and their work corresponds closely to ordinary heavy duty hauling. The next class is composed of powerful machines of about 2-tons capacity, equipped with covered delivery bodies. They distribute products on what is called the wholesale service, to hotels, markets, soda fountains and similar quantity consumers. These cars are built to carry about six hundred quarts of milk apice, and are operated by a crew of two men, one a driver, who also delivers milk when possible. Naturally this kind of service is well adapted to motor hauling, for the runs are fairly long and the stops few in comparison with the house to house delivery route. The third class of service is the long haul suburban delivery to individual customers, and in this work two types of machines are used. Light delivery trucks with covered, side-door bodies handle this work. The heavier machine is about like the wholesale unit, and is sent out with a two-man crew, carrying six hundred quarts, while the lighter one carries about half that quantity of milk and makes its run in charge of a single man who drives and puts out milk. Naturally this lighter unit is adapted to covering the middle zone of distribution, between the outlying suburbs and the thickly peopled areas where the horse is able to serve satisfactorily.

In operating the motor truck fleet successfully the foreman runs across the age-old and universal matter of human na-

Type of milk trucks in Washington D. C.

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ture. Logically it might be expected that the medium capacity motor truck with its ability to transport a big cargo of milk would prove of greatest utility to the company, especially as it makes long runs and is handled by two men who can work together to get the goods out of the cases and to the users' doors. But actually the small one-man machine is most popular with the foreman. He finds that when two men go out together they are prone to pass the buck. If undue noise is made on the route so that customers and others come swarming bodily or by telephone into the main office to register complaints about being wakened too early by the racket, there ensues a difficult problem in locating the guilty man. One claims that the other rattled the bottles or whistled out of key while he remained quiet as the proverbial rock. And of course the other passes it back. But when one man goes out alone he is responsible and can not present an alibi without considerable trouble and evidence.

THE lightest car used is the Ford, equipped with motor truck transmission and the usual milk type body. Eight of them are in constant operation, and they perform with perfect satisfaction. They are the most suitable for green drivers, for nowadays almost every grown man in this land ,of ordinary intelligence either knows how to drive one of these machines or can learn in half an hour. Next in size and capacity are the Studebakers, of which there are six. Their capacity is 1½ tons and they carry six hundred quarts each. Given experienced drivers they are very satisfactory, and have proved up by several years of service. Six light G.M.C. motor trucks also are used for delivery work, equipped for the heavier distribution runs, and they also have made good as day after day performers, as have the two collecting machines of the same make. Three Wilcox machines are giving good service, on the house to house routes. Several other machines have been bought for trials, but they have not been on the job long enough to justify special mention, except for one White which is the veteran of the fleet in point of service, having been at work steadily for eight years. It still is going strong.

Milk delivery in Washington is a gruelling task. The city lies in a region of temperamental climate. The winters ordinarily are mild, but quite often there are sudden changes in temperature accompanied by snow and wind. Thaws come as suddenly, and the drivers often start out upon icy streets and frozen roads to return through mud and water. Because the city has grown abnormally during the war there are many suburbs with partially improved streets, where the gravel surfaces are thin and underlain with treacherous clay. The past winter has witnessed not less than three blizzards with deep snows, and during such storms the milk and delivery trucks were constantly operating under difficulties. Several of the city stores suspended deliveries for longer or shorter periods, depending upon their transportation facilities, but the milk supply people could not stop. And their motor truck fleet, which ordinarily returns to the garage for rest and repairs not later than noon, was kept upon the streets until late afternoon. But the milk went out, which was the main consideration.

A DELIVERY foreman working under such conditions of hard and constant service should be able to speak with authority about the comparative worth of different kinds of motor trucks. And his verdict in this case is that all standard machines are good; their engineers and makers have had time and opportunity to make them mechanically sound. And in the long run there is not much difference in the operating expenses of one as against another. But constant use entails repairs and upkeep, and in this important respect there are differences. The most economical and satisfactory motor trucks are those whose makers or distributors maintain the best service stations. And by this term is meant not so much expert mechanical aid as unfailing supplies of repair parts. A firm operating a fleet of machines necessarily employs its own mechanics to do all the routine repair work and even special tasks, rather than suffer extra expense and loss of time by sending the damaged machines to service stations. But if they can not obtain the duplicates of broken parts upon a moment's notice they are, in slang parlance, up against it right. If a telephone call comes in for the trouble car, the foreman prefers to know that he can get action as soon as the break-down is towed to the shop. He puts his men to work taking down the damaged unit, and as soon as he knows what is needed he sends immediately for the necessary parts, so that they are on hand by the time the crew is ready for them. But in the case of machines whose makers do not maintain service stations or stocks of parts he must exchange parts between the cars he has in the fleet, and although there may be two or more cars of that make he often has one tied up because it has been robbed to keep the others working.

At the beginning of motor truck operation the company kept accurate and individual records of costs and performance. But after a year or two this was discontinued. They determined that motor trucks were a profitable means of handling milk, so they went in for more power wagons. Thus there are no figures available to indicate the financial situation of the motor hauling department. The horse probably will hold his place for short hauls. But as the city grows constantly outward, thereby making hauling distances longer, future additions to transportation facilities undoubtedly will be in the form of more motor trucks.

Milking Time Not Delayed When Trucks Move Herd of Jersey Cows

Des Moines motor truck dealers once more demonstrated the efficient use of the motor truck for farm purposes, in transporting the $150,000 herd of blooded Jersey cattle belonging to E. T. Meredith, Secretary of Agriculture, from Fairview Farm to the Meredith Farm at Lovington Station.

The distance of the haul was fourteen miles and the total time consumed, including loading and unloading, was four hours. The feat was an ample demonstration of the efficiency of the motor truck. Twenty machines, furnished for the occasion by local motor truck dealers, did the work.

The cattle came through in the best possible shape. There was not a single injury of any kind, and no appreciable falling off in milk for even a single milking. Comparing this situation with that which would have prevailed had it been necessary to ship the cattle by train, proves the advantage of the motor truck for farm usage. At the very best the train moving would have meant the loss of one milking, which is always a serious matter to high producing cows of this type; and added to this would have been the jolting and bumping incident to moving by train, which always affords a serious setback.

Trucks Keep Babies from Crying

That the full milk supply of the city of London, a total of 250,000 gallons, was supplied by motor trucks during the ten days of the railroad strikes, is reported in a statement by Gen. C. B. Drake, chief of the motor transport corps, following an inquiry into the value of motor trucks for hauling food.

Milk delivery wagons used by Oyster company.

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Successful Dealers and Their Plants

XV.

CHARLES W. FREY, WHITE DEALER, BLOOMINGTON, ILLINOIS

RANKING with the most successful dealers of Central Illinois is Charles W. Frey, whose cafeteria garage, located at the southwest corner of Madison and Washington streets in Bloomington, is one of the busiest institutions of that city. Coming to Bloomington five years ago after handling agricultural implements and also automobiles in a small way, Mr. Frey soon forged to the front rank in Bloomington in volume of sales and in the aggregate of storage and tourist trade. He is distributer for the White motor truck, the Studebaker automobile, and the Parritt tractor. Mr. Frey has two sons, who are in partnership with him. Both are live wires. Both have received college educations and also commercial training, and they are valuable aids to their parent. Father and sons rank with shrewdest salesmen of Central Illinois.

THE Frey garage is different from the ordinary plant. It is the only one of the kind in Central Illinois and operates upon the cafeteria principle. Patrons help themselves to what they want and pay at the desk, very much like the customers of the modern restaurant. The garage has but one story and there are no elevators to consume time in moving cars up and down. The entrances on different streets permit cars to drive in and out without interfering with each other, and customers have a certain freedom that they appreciate. The Frey firm does not cater to repair business, but there is an ample supply of tools and supplies of all kinds and patrons can take care of their own car needs. The force of mechanics and helpers employed is only sufficient to properly service the machines that the firm sells. Mr. Frey believes that dealers make a mistake in catering to repair departments. He thinks that repair shops should have a monopoly upon this kind of work and that dealers in motor trucks, tractors and automobiles should turn all repair work over to such shops. Storage and the trade of tourists is all that the Frey company seeks, outside of the sale of new machines.

MR. FREY also declines to take used cars in a deal for new. He did not always follow this plan. The first few years he was in business he accepted second-hand cars in part payment for new. His method of disposing of the used cars was by a series of auction sales, arranged quarterly. Mr. Frey finally reached the conclusion that second-hand cars are a losing proposition and that it is business wisdom to decline to accept them upon any basis of value.

The policy of Mr. Frey in operating the garage in relation to tourist trade, has proved successful. It his theory that the public objects to elevators and that car owners prefer to drive in on the main floor, leave their car until ready to drive out again the same way and avoid the delay of going up or down an elevator. The Frey garage is notable for the tremendous floor space, covering nearly a block. There is a frontage of 250 feet on Washington Street and 200 feet on Madison, with wide entrances on both. One sixth of the floor space is devoted to offices, salesroom and accessories, while the remainder is utilized for storage. One of the reasons that inspired the owner to select a large lot and limit his building to one story, was the decreased expense of construction and the economy of operation without an elevator. He figured that the cafeteria type of a garage was the most economical and could be operated with a very limited force of employes. The high price of labor and the scarcity of mechanics and other capable help during the past few years, has demonstrated that Mr. Frey was not wholly wrong in this viewpoint.

SIGNS all over the garage direct tourists and other patrons to the various locations of tools, supplies and other service essentials. There is a comfortable rest-room where especial attention is paid to the comfort of women. Patrons regard the garage as their temporary home and they are made to feel at home. Mr. Frey has a huge map of Illinois painted upon a front window, showing the best roads between all cities. This is also a popular feature. A register is maintained in the office where all patrons are asked to place their names with their address and destination. Letters are thus forwarded and other courtesies shown. This registry system has also been found valuable to the police department in locating some stolen cars. Hesitancy in relation to registering creates suspicion and Mr. Frey promptly communicates with the police when he notes anything unusual or he has reason to believe that cars have been stolen. Mr. Frey also cashes checks for tourists and in other ways caters to their needs. The result has been that his garage is known the country over among transcon-

Outside view of unique truck sales room.

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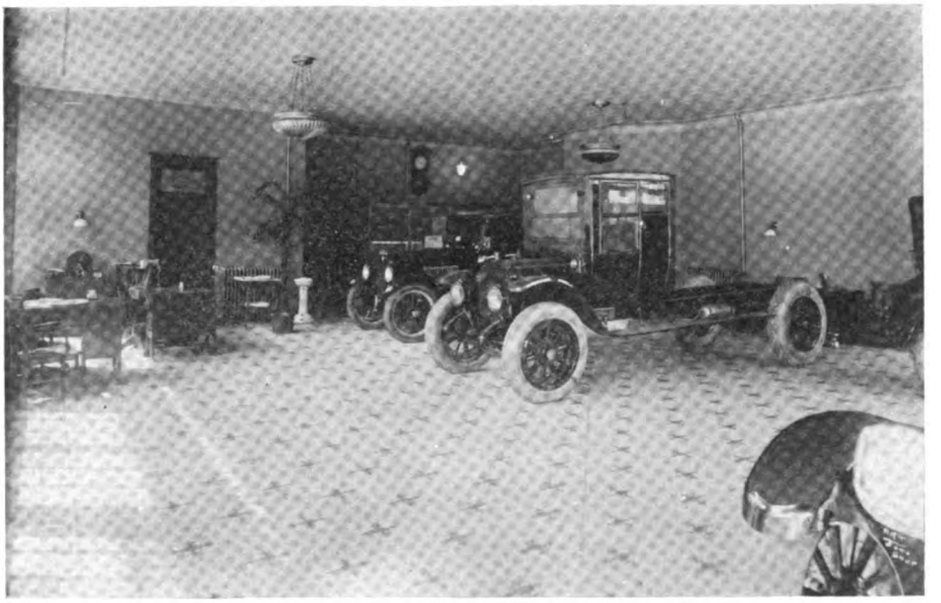
tinental travelers. His garage harks back to the good old tavern days when the stage coach was the principal method of locomotion. Huge signs upon all roads leading to Bloomington, tell of the Frey garage and the tourist accommodations. There are no keys to the garage. The plant is open 24 hours out of the day. The public is always sure of a welcome.

Mr. Frey and his sons also have unique sales methods. They do not go out into the highway and byway after prospects. They advertise and when they have an inquiry or learn of an individual or firm interested in the machine they handle, they explain the merits and invite an investment. Overzealousness and officiousness are taboo and prospects are never irritated by overselling. Mr. Frey believes in demonstrations and is always ready to compete, either in public or private exhibition of motor trucks or tractors. He believes, however, that the best results accrue by sending a motor truck or tractor to the farm and permitting the prospect to witness the actual operation.



Corner of sales room, Frey's cafeteria garage.

XVI.

W. J. LONG, ONEIDA DISTRIBUTER, PEORIA, ILLINOIS

"IT WILL require some one with a greater degree of knowledge than Noah Webster to ring in the various changes on the word 'service' and the dictionary producers of the future should make it a business to call upon motor vehicle dealers for additional meanings before they go to press with their publication," interjected W. J. Long, Peoria, Ill., factory representative and distributor of the Oneida Truck Company, during a fanning bee of motor truck salesmen in his home town the other day. Long ranges as a big gun in the motor truck world and when it was seen that he was keyed up to the right pitch, he was prodded to keep on talking. He was cajoled into some further expressions calculated to interest the trade. Here are some of his pearly thoughts:

"Standing out most prominently among the words in the motor vehicle vocabulary that have been maligned, abused, twisted and distorted, is 'service.' It is the word that has rung the death knell of thousands of dealers. It has wiped away their profits and has given many a receiver a profitable job. It has driven dealer after dealer out of the motor vehicle industry, broke, and down and out, or else into the accessory or repair business exclusively. Many have been forced to hit the road, selling goods for some one else, rather than being in business for themselves. They had to get away from the word 'service' as interpreted wrongfully by so many who essayed to remain in business" continued Long.

"When motor trucks first came out service meant a 'square deal' for the maker, the dealer and the consumer, and all were satisfied. To-day, the general public's interpretation of service is too frequently 'getting all I can for nothing, plus.' This evil started with the passenger car and the dealers had to fight the battle year after year. Now, the motor truck and tractor dealers are facing the same evil. Motor car owners have, in too many instances, year after year, become more persistent and unreasonable in their demands upon the dealer as to 'taking care of the machine after it has been sold.' There is apparently no class of people in the world that expect so much for nothing as motor vehicle owners.

"Suppose, for the sake of argument, we take the case of a manufacturer who invests several thousand dollars in machinery for his plant and also buys a motor truck. Six months later, some trivial portion of his shop machinery and also of the motor truck, becomes worn or broken. Who repairs the lathe or screw machine? His own mechanics, and neither the boss nor the help growl. Who repairs the motor truck? The motor car dealer, of course, and he repairs it ninety times out of a hundred for nothing, just for service. Who pays for the bolt, nut or screw? The dealer. Who pays the mechanic for his time? The dealer. Who is the nanny goat? The dealer.

"When a man purchases a motor vehicle, he usually labors under the mistaken impression that the sale is all velvet for the seller and that the latter is under great obligations to the buyer for placing the order. The patron too often overlooks the heavy overhead expense that must be met by the dealer and that a hundred and one incidentals to the conduct of every well regulated business, must be paid for and that to cut the price of a motor truck, leads to financial suicide. Conditions that confront motor truck dealers are different from those in many other lines.

"It is my observation that too many deal-

(Continued on page 58.)

Interior of cafeteria garage, Bloomington, Illinois.

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500—2,000 (Nash) INTERNAL-COMBUSTION

Line no.	Brand name and model name or number	Price f. o. b. factory with seat and tires but without body.	Make of engine and model number.	Number of cylinders.	Bore and stroke, and N. A. C. C. horse-power.	Lubrication (Forced-feed, Splash).	Make of governor (None).	Water-circulation (Pump, Thermo-siphon).	Radiator (Cellular, Tubular) and make.	Radiator guard included in price? (Yes or No)	Make of carbureter.	Fuels (Distillate, Gasolene, Kerosene).	Ignition (Battery, Magneto) and make of magneto.	Electric starting and lighting included in price? (Yes or No)	Clutch (Cone, Multiple-disk, Plate) and make.	Transmission (Individual-clutch, Planetary, Sliding-gear) and number of forward speeds.	Make of transmission and model number.	Power take-off included in price? (Yes or No)	Make of universal joints.	Line no.
	500 Pounds:																			
1	Pony	$320	Own	4	2¼x4-12.1			T	C, Own		Stromberg		Atwater-K			F, 3				1
	1,000 Pounds:																			
2	Belmont, A	1,150	G B & S-A	4	3¼x4½-22.5	S	Pierce	T	C, Modine	N	Zenith	G	B	Y	P, G B & S	S, 3	Grant-Lees, K	N	Sterling	2
3	Corliss, A	800		4	3¼x4½-15.6			T			Schebler		M, Splitdorf		M					3
4	Croce, 17	825	Wisconsin	4	3½x5-16.9						Zenith		M, Bosch		M, Brown-L	S, 3	Brown-Lipe			4
5	Dodge	935	Own	4	3¼x4½-24.2	FS		P	T		Stewart		B, Northeast		M	S, 3				5
6	Duryea, C	675			12.0	S	N				Kingston		M, Bosch							6
7	Seneca, M		Le Roi, C	4	3¼x4½-15.9	FS		T	C, Kuntz	N	Schebler	G	BM, Bosch	Y	P, Borg & B	S, 3	Warner, B	N	Universal	7
8	Vim, 27	1,095	Own	4	3x4½-14.4	FS	N	T	T, McCord	N	Zenith	G	B	N	C, Own	S, 3	Own	N	Spicer	8
	1,200 Pounds:																			
9	Champion	1,100	Light	4	3¼x4½-16.9	S	N	T	C, Jamestown	N	Carter	G	B	N	P, Borg & B	S, 3		N		9
	1,500 Pounds:																			
10	Atlas	1,260		4	3¼x5-19.6	S		T	C	N		G	B	N	P, Borg & B	S, 3		N		10
11	Bethlehem, K		Own	4	3¼x5-19.6	F	N	T	C, Livingston	N	Zenith	G	M, Bosch	Y	P, Borg & B	S, 3	Detroit, DY	N	Spicer	11
12	Conetsoga, 12	1,850	Continental, N	4	3¼x5-19.6	FS		T	C, Fedders	N	Stromberg	G	M, Simms	Y	M, Fuller	S, 3	Fuller, TU¾	N	Spicer	12
13	Dispatch, G	1,200	Wisconsin	4	3¼x5-22.5	F		T			Rayfield		M, Bosch			4				13
14	Economy, T-LHD	1,250	Own	4	3 11/16x5½-21.1		N	P	C, Own		Zenith		B, Auto-Lite		C, Own	S, 3	Warner		Hartford	14
15	Elmira, C	500	Perkins	4	3¼x4-15.6		N	T	C, Bush		Zenith		Atwater-K		C, Own	S, 2	Own		Own	15
16	Geneva, 1		Beaver	2	5½x5½-22.1		N				Schebler		M, Simms		P, Warner	P, 2				16
17	GMC, 16	1,725	Continental, N	4	3¼x5-22.5	FS	Monarch	P	T, Own	N	Marvel	G	M, Eisemann	N	M, Own	S, 3	Own	N	Own	17
18	International, H	1,750	Own	4	3¼x5½-19.6	FS	Own	P	T, Long, McC	Y	Holley	G	M, Bosch	N	M, Own	S, 3	Own	N	Own	18
19	Kearns, H	1,400	Hers'l-Spil 7000	4	3¼x5-19.6	FS	N	T	C, G & O	N	Zenith	G	B	Y	P, Borg & B	S, 3	Grant Lees, K	N	Peters	19
20	Kissel, General Delivery	2,175	Own	4	3½x5½-24.0	S	Pierce	P	T, Sparks-W	N	Stromberg	G	M, Eisemann	N	M, Warner	S, 3	Warner, T38	N	Spicer	20
21	Old Hickory, M	995	Lycoming	4	3¼x5-16.9		N	T	C, Candler				Connecticut	Y	C, Lycoming	S, 3	Grant-Lees		Thermoid	21
22	Oldsmobile, Ecomony	1,250	Own	4	3 11/16x5½-21.7	F	N	P	C, Own	N	Zenith	G	B	Y	C	S, 3	Warner	N	Spicer	22
23	Patriot, Revere	1,785	Continental	4	3½x5-22.5	S	N	T	C, B & W	N	Stromberg	G	B	Y	P, Borg & B	S, 3	Covert, MA	N	Thermoid	23
24	Rainier, R11	1,850	Continental N	4	3¼x5-19.6	F S	Monarch	T	C, Harrison	N	Zenith	G	M, Simms	N	M, Brown-L	S, 3	Brown-L, 25	Y	Hartford	24
25	Reo, F	1,445	Own	4	4¼x4½-27.2	FS	N	P	T, Own	N	Johnson	G	B	Y	M, Own	S, 3	Own	N	Own	25
26	Stewart, 11	1,350	Le Roi, 2C	4	3¼x4½-15.6	FS	N	T	T, Bush	N	Zenith	G	M, Eisemann	Y	P, Borg & B	S, 3	Durston 02500B	N	Hartford	26
27	Texan	1,200	G B & S	4	4¼x—28.9	F					Carter		M, Delco		M, G B & S	S, 3	Grant-Lees			27
28	Triangle, AA	1,600	Herschell-Spil, 4	4	3½x5-16.9	S	N	T	T, Perfex	N	Stromberg	G	M, Eisemann	Y	M, Fuller	S, 3	Fuller, TU¾	N	Detroit	28
29	Watson, 21		Waukesha, BUX	4	3½x5½-22.5	S	Waukesha	P	C, G & O	N	Johnson	G	B	Y	M, Brown-L	S, 3	Brown-L, 35	N	M & E	29
30	White, 15	2,400	Own	4	3½x5½-22.5	FS	N	P	C	N	Own	G	M	N	P, Own	S, 4	Own	N	Own	30
	2,000 Pounds:																			
31	Acason, R	2,400	Waukesha, BUX	4	3½x5½-22.5	F	Waukesha	P	C, National	Y	Marvel	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, LTU	N	Blood	31
32	Acme, B	2,175	Continental, N	4	3½x5-22.5	FS	Duplex	T	C, G and O	N	Rayfield	G	M Eisemann	N	P, Borg & B	I, 3	Cotta, BUC	N	Blood	32
33	All-American	1,795	Herschell-Spil	4	3¼x5-19.6	FS	Pharo	T	C, Standard		Stromberg		M, Simms		M, Detlaff	I, 3	Cotta		Universal	33
34	Apex, C	1,395	Buda, RU	4	3¼x5½-19.6	FS	N	T	C, Candler	N	Stromberg	G	B, Auto-Lite	N	M, Fuller	S, 3	Fuller, GU¾	N	Detroit	34
35	Atco, IG10	1,875	Buda, WU	4	3¼x5½-22.5	F	N	T	T, Chicago	Y	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, LTU4	Y	Hartford	35
36	Belmont, B	1,950	G B & S, AA	4	3¼x5-22.5	S	Pierce	P	T, Chicago	Y	Zenith	G	M, Eisemann	N	P, G B & S	S, 3	Grant-Lees, 515	N	Sterling	36
37	Bessemer, G	1,825	Continental, N	4	3¼x5-19.6	S	N	T	C, Ideal	N	Zenith	G	M, Bosch	N	M, Fuller	S, 3	Fuller, TU¾	N	Arvac	37
38	Briscoe, T34	1,485	Own	4	3¼x5-18.2		N	T	T, Perfex		Buick		Connecticut	Y	C, Own	S, 3	Own		Universal	38
40	Chicago, C1	2,200	Hercules, CU2	4	3¼x5½-22.5	F	N	P	T, Own	N	Stromberg	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 30	N	Peters	40
41	Clydesdale, 32X	2,375	Continental, N	4	3½x5-22.5	S	Own	T	T, Own	Y	Zenith	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 30	N	Spicer	41
42	Collier, 18		Continental	4	3¼x5-19.6		Monarch	P	T, Long		Zenith		M, Eisemann		M	S, 3	Fuller			42
43	Columbia, F	1,750	Continental, N	4	3½x5-22.5	S	Pierce	P	T, Long	N	Stromberg	G	M, Bosch	N	P, Detlaff	S, 3	Covert, B	N	Spicer	43
44	Commerce, E	1,855	Continental, N	4	3½x5-22.5	S	N	T	T, Long	N	Zenith	G	M, Eisemann	N	C, Detroit	S 3	Detroit, C	N	Spicer	44
45	Conestoga, 20	2 100	Continental, N	4	3¼x5-19.6	FS		T	T, E & M	N	Stromberg	G	M, Simms	N	M, Fuller	S, 3	Fuller, TU¾	N	Sterling	45
46	Corbitt, E	2,200	Continental, N	4	3¼x5-22.5	FS	Duplex	T	T, McCord	N	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller	N	Hartford	46
47	Dart, H	2,100	Buda, WU	4	3¼x5½-22.5	F	Pierce	T	C, Own	N	Zenith	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU	Y	Spicer	47
48	Day-Elder, A	1,775	Continental	4	3¼x5-19.6		N	T	T, Bush		Zenith		M, Berling		M, Covert	S, 3	Covert		Hartford	48
49	Denby, 12	1,950	Continental, N	4	3¼x5-19.6	F	Monarch	T	T, Long	Y	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU¾	N	Universal	49
50	Diehl, A	1,575	Continental, N	4	3¼x5-19.6	FS	N	T	C, Standard	N	Zenith	G	M, Simms	N	P, Borg & B	S, 3	Durston, 02800		Hartford	50
51	Famous, B10	1,690	Continental	4	3¼x5-19.6		Monarch	T	T, Chicago		Stromberg		M, Eisemann		M, Fuller	S, 3	Fuller		Sterling	51
52	Federal, SD	2,400	Continental, J-4	4	3½x5-22.5	F	Pharo	P	T, McCord	Y	Zenith	G	M, Eisemann	N	P, Borg & B	S, 3	Own	N	Peters	52
53	Ford, T	550	Own	4	3¼x4-22.5	FS	N	T	T, Own	N	Kingston	G	M, Own	N	M, Own	P, 2	Own	N	Own	53
54	Fulton			4	3¼x5-19.6			T						Y	P, Borg & B	3				54
55	Gabriel, C	2,000	Buda	4	4¼x5½-28.9		N	P	C, G & O		Rayfield		M, Bosch		P, Borg & B	S, 3	Brown-Lipe		Spicer	55
56	Gary, F	2,100	Buda, WU	4	3½x5-22.5	F	Pierce	P	T, Chicago	Y	Master	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU¾	N	Blood	56
57	Giant, 15	1,950	Continental, N	4	3¼x5-22.5	FS	N	T	C, Ideal	N	Schebler	GK	M, Eisemann	N	M, Brown-L	S, 3	Brown-L, 30	N	Spicer	57
58	GMC, 16	†1,595	Continental, N	4	3¼x5-22.5	FS	Monarch	P	T, Own	N	Marvel	G	M, Eisemann	N	M, Own	S, 3	Own	N	Own	58
59	Hahn, C	1,375	Continental, N	4	3¼x5-19.6	FS			T, Chicago		Stromberg		M, Eisemann		M, Detroit	S, 3	Detroit			59
60	Hal-Fur, C	2,000	Buda	4	4x5-25.6		Duplex	P	T, G & O		Stromberg		M, Bosch	N	P, Borg & B	S, 4	Brown-Lipe		Peters	60
61	Higrade, A18	2,100	Continental, N	4	3¼x5-19.6	FS	Simplex		C, Perfex		Zenith		M, Eisemann		M, Fuller	S, 3	Fuller			61
62	Hoover, 15B	1,435	Continental, N	4	3¼x5-19.6	FS		T	C, Candler		Schebler		M, Splitdorf		M, Fuller	S, 3	Fuller			62
63	Independent (Ohio), F	1,685	Continental	4	3¼x5-19.6		Monarch	T	T, National		Zenith		M, Eisemann		M, Fuller	S, 3	Fuller		Sterling	63
64	International, F	1,950	Own	4	3¼x5½-19.6	FS	Own	P	T, Long, McC	Y	Holley	G	M, Bosch	N	M, Own	S, 3	Own	N	Own	64
65	Jones, 31A	1,395	Continental, N	4	3¼x5-19.6	F	Pierce	P	C, Fedders	N	Stromberg	G	M, Eisemann	N	P, Borg & B	S, 3	Grant-Lees, 515	N	Arvac	65
66	Kleiber, AA	2,400	Continental, C4	4	3½x5½-22.5	S	Pierce	P	C, Perfex	N	Stromberg	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 35	N	Spicer	66
67	Maccar, S1	2,400	Continental, J4	4	3½x5-22.5	F	N	P	T, Own	N	Stromberg	G	M, Eisemann	N	M, Brown-L, 30	S, 3	Brown-L, 30	N	Spicer	67
68	Menominee, Hurryton		Continental, N	4	3½x5-22.5	S	Monarch	T	C, G & O	N	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU1	N	Spicer	68
69	Myers, 60	1,545	Lycoming	4	3¼x5-19.6	FS	N	T	C, Standard	N	Zenith	G	M, Eisemann	N	M, Mechanics	S, 3	Mechanics	N	Universal	69
70	Napoleon, 9		Victory	4	3¼x5-19.6	F	N	T	T, Chicago	Y	Stromberg	G	B	N	M, Fuller	S, 3	Fuller, TU¾	N	Universal	70
71	Nash, 2018	17,85	Own	4	3¼x5½-22.5	FS	Simplex	T	T, Long	N	Stromberg	G	M, Eisemann	Y	P, Borg & B	S, 3	Detroit, C	N	Own	71

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TRUCK SPECIFICATIONS

500—2,000 (Nash)

Line no.	Final drive (Bevel, Chain, Internal-gear, Spur-and-bevel, Worm) and make of rear axle and model number.	Hotchkiss drive? (Yes or No)	Differential (Bevel, Spur, Worm) and make.	Number and location of driving-wheels (Front, Rear).	Clearance under front and rear axles.	Service and emergency brakes (Contracting, Expanding).	Frame material (Pressed-steel, Rolled-steel) and make.	Front and rear springs (Cantaliver; 1-2, 3-4, or Full elliptic; Transverse).	Make of springs.	Leaves in front and rear springs.	Length and width of front and rear springs.	Driver's position (Left, Right).	Make of steering gear.	Turning-circle diameter (feet and inches).	Wheels (Iron, Steel, Wood) and make.	Wheel-base (standard).	Front and rear tire sizes (dual, pneumatic).	Weight of chassis (pounds).	Perc. of weight on rear axle when empty & when loaded.	Line no.
1	C, Own			2, R		E,	R, Own	½, ½	Tuthill			L	Own		W, Prudden	90	28x3p-28x3p			1
2	B, Flint	Y	B	2, R	9½, 9½	C, E	P	½, ½	Mather	7, 8	36¾x1¾-50x2½	L	Lavine	36, 0	W, E & O.	113	31x4p-31x4p	2,200	45, 75	2
3	B			2, R		E, E	P	½, ½							W	100	31x4-31x4			3
4	B, Timken			2, R		C, E	P									108	32x4-32x4			4
5	B			2, R					Detroit						W	114	33x4p-33x4p			5
6				2, R		E,	P	C, T							W	86	36x3½p-36x3½p			6
7	B, Peru, 3050		B	2, R	9½, 8½	E, C	P	½, C		6, 9	36x1½-51x2	L	Ditweiler		W	108	30x3½p-30x3½p			7
8	W, Sheldon, W500	Y	W	2, R	11, 10½	E, E	P	½, ½	Shelden	8, 7	38x2-50x2	L	Jacox	30, 10	W, Hoopes	108	31x4p-31x4p	2,120	40, 70	8
9	B	Y	B	2, R	10, 10	C, E	P	½, ½		7, 8	36x2-50x2	L			W	114	32x4p-32x4p	1,900	60, 70	9
10	B	Y		2, R		C, E	P	½, ½		8, 10	36x2-46x2	L	C. A. S.		W	118	32x4p-32x4p			10
11	B, Std Pts, 3070	Y		2, R	10, 12	C, E	P, Detroit	½, ½	Mather	7, 9	36x2-50x2½	L	Ross	48, 0	W, Wayne	125	34x4½p-35x5p	2,660	—, 80	11
12	I, Torbensen, OX2	Y	B	2, R	9½, 10½	C, E	P, Savage	½, ½	Iron City	7, 9	36x2-48x2½	L	C.A.S.	44, 0	W, E & O.	124	32x4½p-32x4½p	2,800	50, 60	12
13	I			2, R				½, ½	Tuthill						W	120	34x4p-34x4p			13
14	I, Torbensen			2, R		C, E	P	½, ½	Spring Perch			L	Jacox		W, Auto	128	35x5p-35x5p			14
15	B, Own			2, R		E, E	R, Own	½, ½	Tuthill			L	Own			104	28x3p-28x3p			15
16	C, Sheldon			2, R					Sheldon						W	96	34x2-36x2½			16
17	B, Own	N		2, R	10¾, 8½	C, E	P, Smith	½, ½	Detroit	8, 11	38x2½-54x2½	L	Jacox	46, 0	W	132	35x5p-35x5p	2,940	50, 67	17
18	I, Own		B	2, R	10½, 11½	E, E	P	½, ½		8, 10	41x2½-54x2½	L	Own		W	115	36x3-36x3½	2,900	50, 64	18
19	I, Torbensen, OX2L	Y	B S	2, R	12, 13	E, C	P	½, ½	Mather	6, 9	36x2-50x2	L	Lavine		W, E & O.	118	32x4½p-32x4½p	2,200	65, 80	19
20	W, Own	Y	B	2, R	9¾, 10	E, E	P, Smith	½, ½	Mather	8, 10	36x2-50x2½	L	Jacox	50, 0	W, Prudden	135	34x4½p-34x4½p	2,900	52, 68	20
21	B, Salisbury			2, R		C, E	R, Own	½, ½	Spring Perch			L	C.A.S.		W, Salisbury	112	33x4p-33x4p			21
22	I, Torbensen, OX2	Y	W	2, R	10¾, 12	C, E	P, Smith	½, ½		7, 10	37x2-50x2½	L	Jacox	46, 0	W	128	35x5p-35x5p	2,580	55, 75	22
23	W, Empire, B	Y	B	2, R	13½, 12	E, E	P, Detroit	½, ½	Cooper	7, 12	38x2½-50x2½	L	C.A.S.	43, 4	W, Bimel	128	35x5p-35x5p	2,800	42, 58	23
24	W, Timken 6352	Y	B	2, R	10, 10½	E, E	P, Parish	½, ½	Perfection	8, 9	38x2-50x2½	L	Lavine		W, Schwarz	125	34x4½p-34x4½p	2,400	75, 75	24
25	B, Own	N	B	2, R	11¾, 9¼	C, E	P, Own	½, ½	Penn		38x2-40x2½	L	Own	44, 0	W	128	34x4½p-34x4½p	2,615	43½, 62½	25
26	I, Clark, AS	Y	B	2, R	10, 10	C, C	P, Hydraulic	½, ½	Detroit	6, 9	37½x2-48½x2½	L	C.A.S.	42, 0	W, Wayne	110	32x4p-32x4p	2,190	53, 66⅔	26
27	B, Salisbury			2, R		E, E		½, ½							W	115	33x4p-33x4p			27
28	I, Clark, AS	Y	B	2, R		C, C	R, Mason	½, ½	Detroit	7, 10	42x2-54x2½	L	Gemmer		W, Hayes	115	35x5p-35x5p	2,600	60, 80	28
29	W, Empire, B	Y	B	2, R	10½, 11	E, E	P, Parish	½, ½	Sheldon	8, 8	40x2½-50x2½	L	Lavine		W, Hoopes	128	34x4½p-34x4½p			29
30	B, Own	N	B	2, R	9¼, 9	C, E	P	½, ½				L	Own	50, 4	W	133½	34x4½p-34x4½p	2,960	54, 70	30
31	W, Timken, 6352	Y	W	2, R	11, 11	E, E	P, Savage	½, ½	Detroit	8, 12	40x2½-50x2½	L	Ross		W, Bimel	142	36x3½-36x5	3,650	—, 73	31
32	W, Timken, 6352	Y	B	2, R	9, 9½	E, E	P	½, ½	Detroit	7, 11	38x2½-52x2½	L	Ross	54, 0	W, Bimel	130	34x3½-34x5	3,200	51, 80	32
33	I, Torbensen		W, Powrlok	2, R		C, E	P, Detroit	½, ½	Detroit	9, 13	38x2-54x2½	L	Ross		W	130	32x4-32x4			33
34	I, Torbensen	Y	B	2, R	10½, 11¼	C, E	R	½, ½	Detroit	8, 11	36x2-52½x2½	L	Lavine		W, Bimel	130	33x4p-32x3½	2,870	—, 66	34
35	I	Y		2, R				½, ½			40x2½-50x2½	L			W	132	34x4½p-36x6p			35
36	I, Clark	N	B	2, R	12, 12	C, E	R, Savage	½, ½	Mather	7, 11	40x2½-52½x2½	L	Lavine	44, 0	W, E & O.	144	34x4½p-36x5	3,200	50, 75	36
37	I, Torbensen, A	Y	B	2, R	11, 11¾	C, E	P	½, ½	Perfection	8, 10	39x2½-52x2½	L	Ross	54, 0	W, Schwarz	124	34x3-34x4	2,910	47, 60	37
38	I, Russel			2, R		C, E	P, Parish	½, ½	Alloy			L	Lavine		W, Hayes	121	33x4-34x3½			38
40	W, Timken, 6460	Y	B	2, R	10½, 11	E, E	R, Own	½, ½	Mather	8, 9	40x2½-54x3	L	Gemmer		W, Standard	132	36x3-36x4	3,800	60, 75	40
41	W, Std Pts, 602	N	B	2, R	11, 10	E, E	P, Parish & B	½, ½	Perfection	9, 7	36x2½-52x3	L	Ross		W, Bimel	144	34x3½-34x5	3,500	51, 62	41
42	W			2, R		E, E	P	½, ½					Ross			140	34x4-34x5			42
43	I, Russel, PI300	Y	B	2, R		C, E	R, Own	½, ½	Perfection	8, 10	38x2½-48x3	L	Own		W, St. Mary	120	34x3½-34x4	3,300		43
44	I, Torbensen, A	Y	B	2, R	10, 11½	C, E	P, Detroit	½, ½	Detroit	8, 10	36x2½-50x3	L	Jacox	46, 0	W, Bimel	126	34x3-34x5	2,900		44
45	W, Wis., 800D	Y	W	2, R	10½, 9	E, E	R, Own	½, ½	Iron City	8, 10	36x2½-48x2½	L	Ross	50, 0	W, E & O.	128	34x3½-34x5	3,400	50, 65	45
46	W, Sheldon	Y	W	2, R		E, E	R, Own	½, ½	Mather	8, 10	38x2½-50x2½	L	Ross		W, Bimel	130	34x3½-34x4		70, 70	46
47	W, Own	Y	B	2, R	10½, 10½	E, E	P, Savage	½, ½	Perfection	7, 11	37x2-54x2½	L	Ross	44, 0	W, Prudden	130	34x3½-34x5	3,200	50, 80	47
48	W, Wisconsin			2, R		E, E	P, Savage	½, ½				L	Ross		W, Jones	128	34x3-34x4			48
49	I, Russel, P	Y	B	2, R	10, 12½	C, E	P, Detroit	½, ½	Detroit	8, 10	43½x2½-48x2½	L	Ross	54, 0	W, Hayes	124	35x5p-36x6p	2,770	51, 73	49
50	I, Torbensen OX2L	Y	W	2, R	10, 12	C, C		½, ½	Rowland	8, 12	34½x2½-48x2½	L	Jacox	18, 0	W, Schwarz	115	34x4½p-35x5p	2,400	—, 90	50
51	I, Clark			2, R		C, C	P, Savage	½, ½	Sheldon			L	Ross		W, Bimel	120	36x3½-36x4			51
52	W, Timken, 6352	N	B	2, R	13, 12	E, E	P	½, ½	Mather	7, 8	40x2½-52x2½	L	Gemmer	46, 9	S, Detroit	132	35x5p-36x6p	3,600	55, 70	52
53	W, Own	N	W	2, R	10¾, 8½	C, E	P, Parish & B	½t, ½t	Own	7, 9	31⅝x1½-16½x3	L	Own	46, 0	W	124	30x3p-32x3½	1,465		53
54	I			2, R		C, C	P								W					54
55	W, Timken			2, R		E, E	P, Parish	½, ½	Merrill			L	Gemmer		W, Standard	136	35x5p-35x5p			55
56	W, Timken, 6352	Y	W	2, R	12¼, 11½	E, E	P	½, ½	Tuthill	8, 11	40x2½-52x2½	L	Ross	42, 0	W, Prudden	130	36x3½-36x4	3,200	50, 20	56
57	W, Sheldon, W1500	Y	B	2, R	13, 9¾	E, E	P, Hydraulic	½, ½	Mather	6, 9	38x2-48x2½	R	Jacox		W, Wayne	130	34x3½-34x5	2,950	50, 68	57
58	B, Own	N	B	2, R	10¾, 8¾	E, E	P	½, ½	Detroit	8, 11	38x2½-54x2½	L	Jacox	46, 0	W	132	35x5p-35x5p	2,760	50, 67	58
59	I, Torbensen			2, R			P, Parish	½, ½	Delaney				Lavine		W	127	34x3-34x4			59
60	W, Timken			2, R		E, E	P, Parish & B	½, ½	Spring Perch			L	Gemmer		W, Standard	136	35x5p-35x5p			60
61	W, Sheldon			2, R		E, E	P, Own	½, ½	Perfection				Lavine		W, Prudden	115	35x5-35x5			61
62	W, Sheldon			2, R		E, E	P, Detroit	½, ½	Sheldon				Lavine		W	120	32x4-33x4½			62
63	W, Chicago			2, R		E, E	P, Parish & B	½, ½	Iron City			L	Ross		W, Wayne	128	34x3½-34x4			63
64	I, Own		B	2, R	10½, 11½	E, E	P	½, ½		10, 12	40½x2½-54x2½	L	Own		W	128	36x3½-36x4	3,000	50, 64	64
65	I, Russel, O	Y	S	2, R	11½, 11½	C, E	P, Hydraulic	½, ½	Champion	9, 11	37x2½-51½x2½	L	C.A.S.	40, 0	W, Prudden	130	34x3½-34x4	3,400	20, 80	65
66	W, Timken, 6460	Y	W	2, R	9, 9	E, E	R	½, ½	Betts	7, 11	44x2½-52x3	R	Ross		W, W't'rh'se	130	34x3½-34x5	4,300	50, 75	66
67	W, Timken, 6352	N	B	2, R		E, E	P, Parish	½, ½	Merrill	7, 10	40x2-52x2½	L	Ross		W, Schwarz	138	34x3½-34x5	3,500	47, 70	67
68	W, Timken, 6460	N	B	2, R		E, E	R	½, ½	Tuthill	9, 12	39x2½-50x2½	L	Ross		W, Standard	130	34x3½-34x4	3,600		68
69	W, Chicago, C	Y	B	2, R	10½, 10	E, E	P, Parish & B	½, ½	Cleveland	7, 8	36x2-50x3	L	C.A.S.		W, E & O.	130	34x2½-34x4	2,850	50, 75	69
70	I, Clark, AS	N	B	2, R	14, 14	C, C	R, Own	½, ½	Mather	8, 10	35x2-46x2½	L	Lavine	48, 0	W, Royer	133	35x5p-35x5p	3,200	50, 65	70
71	I, Clark, 1	Y	W	2, R	9½, 9¾	C, C	P, Own	½, ½	Alloy	10, 12	37½x2½-52x2½	L	Jacox	47, 0	W, Auto	130	34x3-34x4	3,400	44, 67½	71

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INTERNAL-COMBUSTION

500—2,000 (Nash)

Line no.	Brand name and model name or number	Price f. o. b. factory with seat and tires but without body.	Make of engine and model number.	Number of cylinders.	Bore and stroke, and N. A. C. C. horse-power.	Lubrication (Forced-feed, Splash).	Make of governor (None).	Water-circulation (Pump, Thermo-siphon).	Radiator (Cellular, Tubular) and make.	Radiator guard included in price? (Yes or No)	Make of carbureter.	Fuels (Distillate, Gasolene, Kerosene).	Ignition (Battery, Magneto) and make of magneto.	Electric starting and lighting included in price? (Yes or No)	Clutch (Cone, Multiple-disk, Plate) and make.	Transmission (Individual-clutch, Planetary, Sliding-gear) and number of forward speeds.	Make of transmission and model number.	Power take-off included in price? (Yes or No)	Make of universal joints.	Line no.
	500 Pounds:																			
1	Pony	$320	Own	4	2¾x4-12.1			T	C, Own		Stromberg		Atwater-K			F, 3				1
	1,000 Pounds:																			
2	Belmont, A	1,150	G B & S-A	4	3¾x4½-22.5	S	Pierce	T	C, Modine	N	Zenith	G	B	Y	P, G B & S	S, 3	Grant-Lees, K	N	Sterling	2
3	Corliss, A	800		4	3¾x4½-15.6			T			Schebler		M, Splitdorf		M					3
4	Croce, 17	825	Wisconsin	4	3¾x5-16.9						Zenith		M, Bosch		M, Brown-L	S, 3	Brown-Lipe			4
5	Dodge	935	Own	4	3¾x4½-24.2	FS		P	T		Stewart		B, Northeast		M	S, 3				5
6	Duryea, C	675			12.0	S	N				Kingston		M, Bosch							6
7	Seneca, M		Le Roi, C	4	3¾x4½-15.9	FS		T	C, Kuntz	N	Schebler	G	BM, Bosch	Y	P, Borg & B	S, 3	Warner, B	N	Universal	7
8	Vim, 27	1,095	Own	4	3x4½-14.4	FS	N	T	T, McCord	N	Zenith	G	B	N	C, Own	S, 3	Own	N	Spicer	8
	1,200 Pounds:																			
9	Champion	1,100	Light	4	3¾x4½-16.9	S	N	T	C, Jamestown	N	Carter	G	B	N	P, Borg & B	S, 3		N		9
	1,500 Pounds:																			
10	Atlas	1,260		4	3½x5-19.6	S		T	C	N		G	B	N	P, Borg & B	S, 3		N		10
11	Bethlehem, K		Own	4	3½x5-19.6	F	N	T	C, Livingston	N	Zenith	G	M, Bosch	Y	P, Borg & B	S, 3	Detroit, DY	N	Spicer	11
12	Conetsoga, 12	1,850	Continental, N	4	3½x5-19.6	FS		T	C, Fedders	N	Stromberg	G	M, Simms	Y	M, Fuller	S, 3	Fuller, TU¾	N	Spicer	12
13	Dispatch, G	1,200	Wisconsin	4	3¾x5-22.5	F		T			Rayfield		M, Bosch			4				13
14	Economy, T-LHD	1,250	Own	4	3 11/16x5½-21.1		N	P	C, Own		Zenith		B, Auto-Lite		C, Own	S, 3	Warner		Hartford	14
15	Elmira, C	500	Perkins	4	3¼x4-15.6		N	T	C, Bush		Zenith		Atwater-K		C, Own	S, 2	Own		Own	15
16	Geneva, 1		Beaver	2	5½x5½-22.1		N				Schebler		M, Simms		P, Warner	P, 2				16
17	GMC, 16	1,725	Continental, N	4	3¾x5-22.5	FS	Monarch	P	T, Own	N	Marvel	G	M, Eisemann	N	M, Own	S, 3	Own	N	Own	17
18	International, H	1,750	Own	4	3¾x5½-19.6	FS	Own	P	T, Long, McC	Y	Holley	G	M, Bosch	N	M, Own	S, 3	Own	N	Own	18
19	Kearns, H	1,400	Hers'l-Spil 7000	4	3¾x5-19.6	FS	N	T	C, G & O	N	Zenith	G	B	Y	P, Borg & B	S, 3	Grant Lees, K	N	Peters	19
20	Kissel, General Delivery	2,175	Own	4	3¾x5½-24.0	S	Pierce	P	T, Sparks-W	N	Stromberg	G	M, Eisemann	N	M, Warner	S, 3	Warner, T38	N	Spicer	20
21	Old Hickory, M	995	Lycoming	4	3½x5-16.9		N	P	C, Candler				Connecticut	Y	C, Lycoming	S, 3	Grant-Lees		Thermoid	21
22	Oldsmobile, Ecomony	1,250	Own	4	3 11/16x5½-21.7	F	N	P	C, Own	N	Zenith	G	B	Y	C	S, 3	Warner	N	Spicer	22
23	Patriot, Revere	1,785	Continental	4	3¾x5-22.5	S	N	P	C, B & W	N	Stromberg	G	B	Y	P, Borg & B	S, 3	Covert, MA	N	Thermoid	23
24	Rainier, R11	1,850	Continental N	4	3¾x5-19.6	F S	Monarch	T	C, Harrison	N	Zenith	G	M, Simms	N	M, Brown-L	S, 3	Brown-L, 25	Y	Hartford	24
25	Reo, F	1,445	Own	4	4¼x4½-27.2	FS	N	P	T, Own	N	Johnson	G	B	Y	M, Own	S, 3	Own	N	Own	25
26	Stewart, 11	1,350	Le Roi, 2C	4	3¾x4½-15.6	FS	N	T	T, Bush	N	Zenith	G	M, Eisemann	Y	P, Borg & B	S, 3	Durston 02500B	N	Hartford	26
27	Texan	1,200	G B & S	4	4¼x—28.9	F					Carter		M, Delco		M, G B & S	S, 3	Grant-Lees			27
28	Triangle, AA	1,600	Herschell-Spil, 4	4	3¾x5-16.9	S	N	T	T, Perfex	N	Stromberg	G	M, Eisemann	Y	M, Fuller	S, 3	Fuller, TU¾	N	Detroit	28
29	Watson, 21		Waukesha, BUX	4	3¾x5½-22.5	S	Waukesha	P	C, G and O	N	Rayfield	G	B	Y	M, Brown-L	S, 3	Brown-L, 35	N	M & E	29
30	White, 15	2,400	Own	4	3¾x5½-22.5	FS	N	P	C	N	Own	G	M	N	P, Own	S, 4	Own	N	Own	30
	2,000 Pounds:																			
31	Acason, R	2,400	Waukesha, BUX	4	3¾x5½-22.5	F	Waukesha	P	C, National	Y	Marvel	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, LTU	N	Blood	31
32	Acme, B	2,175	Continental, N	4	3¾x5-22.5	FS	Duplex	P	C, G and O	N	Rayfield	G	M, Eisemann	N	P, Borg & B	I, 3	Cotta, BUC	N	Blood	32
33	All-American	1,795	Herschell-Spil	4	3¾x5-19.6	FS	Pharo	T	C, Standard		Stromberg		M, Simms		M, Detlaff	I, 3	Cotta		Universal	33
34	Apex, C	1,395	Buda, RU	4	3¾x5½-19.6	FS	N	T	C, Candler	N	Stromberg	G	B, Auto-Lite	N	M, Fuller	S, 3	Fuller, GU¾	N	Detroit	34
35	Atco, IG10	1,875	Buda, WU	4	3¾x5½-22.5	F	N	T	T, Chicago	Y	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, LTU4	Y	Hartford	35
36	Belmont, B	1,950	G B & S, AA	4	3¾x5-22.5	S	Pierce	P	T, Chicago	Y	Zenith	G	M, Eisemann	N	P, G B & S	S, 3	Grant-Lees, 515	N	Sterling	36
37	Bessemer, G	1,825	Continental, N	4	3¾x5-19.6	S	N	T	C, Ideal	N	Zenith	G	M, Bosch	N	M, Fuller	S, 3	Fuller, TU¾	N	Arvac	37
38	Briscoe, T34	1,485	Own	4	3¾x5-18.2		N	T	T, Perfex		Buick		Connecticut	Y	C, Own	S, 3	Own		Universal	38
40	Chicago, C1	2,200	Hercules, CU2	4	3¾x5½-22.5	F	N	P	T, Own	N	Stromberg	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 30	N	Peters	40
41	Clydesdale, 32X	2,375	Continental, N	4	3¾x5-22.5	S	Own	T	T, Own	Y	Zenith	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 30	N	Spicer	41
42	Collier, 18		Continental	4	3¾x5-19.6		Monarch	P	T, Long		Zenith		M, Eisemann		M	S, 3	Fuller			42
43	Columbia, F	1,750	Continental, N	4	3¾x5-22.5	S	Pierce	P	T, Long	N	Stromberg	G	M, Bosch	N	P, Detlaff	S, 3	Covert, B	N	Spicer	43
44	Commerce, E	1,855	Continental, N	4	3¾x5-22.5	S	N	T	T, Long	N	Zenith	G	M, Eisemann	N	C, Detroit	S, 3	Detroit, C	N	Spicer	44
45	Conestoga, 20	2 100	Continental, N	4	3¾x5-19.6	FS		T	T, E & M	N	Stromberg	G	M, Simms	N	M, Fuller	S, 3	Fuller, TU¾	N	Sterling	45
46	Corbitt, E	2,200	Continental, N	4	3¾x5-22.5	FS	Duplex	T	T, McCord	N	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller	N	Hartford	46
47	Dart, H	2,100	Buda, WU	4	3¾x5½-22.5	F	Pierce	T	C, Own	N	Zenith	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU	Y	Spicer	47
48	Day-Elder, A	1,775	Continental	4	3¾x5-19.6		N	T	T, Bush		Zenith		M, Berling		M, Covert	S, 3	Covert		Hartford	48
49	Denby, 12	1,950	Continental, N	4	3¾x5-19.6	F	Monarch	T	T, Long	Y	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU¾	N	Universal	49
50	Diehl, A	1,575	Continental, N	4	3¾x5-19.6	FS	N	T	C, Standard	N	Zenith	G	M, Simms	N	P, Borg & B	S, 3	Durston, 02800		Hartford	50
51	Famous, B10	1,690	Continental	4	3¾x5-19.6		Monarch	T	T, Chicago		Stromberg		M, Eisemann		M, Fuller	S, 3	Fuller		Sterling	51
52	Federal, SD	2,400	Continental, J-4	4	3¾x5-22.5	F	Pharo	P	T, McCord	Y	Zenith	G	M, Eisemann	N	P, Borg & B	S, 3	Own	N	Peters	52
53	Ford, T	550	Own	4	3¾x4-22.5	FS	N	T	T, Own	N	Kingston	G	M, Own	N	M, Own	P, 2	Own	N	Own	53
54	Fulton			4	3¾x5-19.6			T						Y	P, Borg & B					54
55	Gabriel, C	2,000	Buda	4	4¼x5½-28.9		N	P	C, G & O		Rayfield		M, Bosch		P, Borg & B	S, 3	Brown-Lipe		Spicer	55
56	Gary, F	2,100	Buda, WU	4	3¾x5-22.5	F	Pierce	P	T, Chicago	Y	Master	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU¾	N	Blood	56
57	Giant, 15	1,950	Continental, N	4	3¾x5-22.5	FS	N	T	C, Ideal	N	Schebler	GK	M, Eisemann	N	M, Brown-L	S, 3	Brown-L, 30	N	Spicer	57
58	GMC, 16	†1,595	Continental, N	4	3¾x5-22.5	FS	Monarch	P	T, Own	N	Marvel	G	M, Eisemann	N	M, Own	S, 3	Own	N	Own	58
59	Hahn, C	1,375	Continental, N	4	3¾x5-19.6	FS			T, Chicago		Stromberg		M, Eisemann		M, Detroit	S, 3	Detroit			59
60	Hal-Fur, C	2 000	Buda	4	4x5-25.6		Duplex	P	T, G & O		Stromberg		M, Bosch	N	P, Borg & B	S, 4	Brown-Lipe		Peters	60
61	Higrade, A18	2,100	Continental, N	4	3¾x5-19.6	FS	Simplex		C, Perfex		Zenith		M, Eisemann		M, Fuller	S, 3	Fuller			61
62	Hoover, 15B	1,435	Continental, N	4	3¾x5-19.6	FS		T	C, Candler		Schebler		M, Splitdorf		M, Fuller	S, 3	Fuller		Sterling	62
63	Independent (Ohio), F	1,685	Continental	4	3¾x5-19.6		Monarch	T	T, National		Zenith		M, Eisemann		M, Fuller	S, 3	Fuller			63
64	International, F	1,950	Own	4	3¾x5½-19.6	FS	Own	P	T, Long, McC	Y	Holley	G	M, Bosch	N	M, Own	S, 3	Own	N	Own	64
65	Jones, 31A	1,395	Continental, N	4	3¾x5-19.6	F	Pierce	P	C, Fedders	N	Stromberg	G	M, Eisemann	N	P, Borg & B	S, 3	Grant-Lees, 515	N	Arvac	65
66	Kleiber, AA	2,400	Continental, C4	4	3¾x5½-22.5	S	Pierce	P	C, Perfex	N	Stromberg	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 35	N	Spicer	66
67	Maccar, S1	2,400	Continental, J4	4	3¾x5-22.5	F	N	P	T, Own	N	Stromberg	G	M, Eisemann	N	M, Brown-L, 30	S, 3	Brown-L, 30	N	Spicer	67
68	Menominee, Hurryton		Continental, N	4	3¾x5-22.5	S	Monarch	T	C, G & O	N	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU1	N	Spicer	68
69	Myers, 60	1,545	Lycoming	4	3¾x5-19.6	FS	N	T	C, Standard	N	Zenith	G	M, Eisemann	N	M, Mechanics	S, 3	Mechanics	N	Universal	69
70	Napoleon, 9		Victory	4	3¾x5-19.6	F	N	T	T, Chicago	Y	Stromberg	G	B	N	M, Fuller	S, 3	Fuller, TU¾	N	Universal	70
71	Nash, 2018	17,85	Own	4	3¾x5½-22.5	FS	Simplex	T	T, Long	N	Stromberg	G	M, Eisemann	Y	P, Borg & B	S, 3	Detroit, C	N	Own	71

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TRUCK SPECIFICATIONS

500—2,000 (Nash)

Line no.	Final drive (Bevel, Chain, Internal-gear, Spur-and-bevel, Worm) and make of rear axle and model number.	Hotchkiss drive? (Yes or No)	Differential (Bevel, Spur, Worm) and make.	Number and location of driving-wheels (Front, Rear).	Clearance under front and rear axles.	Service and emergency brakes (Contracting, Expanding).	Frame material (Pressed-steel, Rolled-steel) and make.	Front and rear springs (Cantaliver; 1-2, 3-4, or Full elliptic; Transverse).	Make of springs.	Leaves in front and rear springs.	Length and width of front and rear springs.	Driver's position (Left, Right).	Make of steering gear.	Turning-circle diameter (feet and inches).	Wheels (Iron, Steel, Wood) and make.	Wheel-base (standard).	Front and rear tire sizes (dual, pneumatic).	Weight of chassis (pounds).	Perc. of weight on rear axle when empty & when loaded.	Line no.
1	C, Own			2, R		E,	R, Own	½, ½	Tuthill			L	Own		W, Prudden	90	28x3p-28x3p			1
2	B, Flint	Y	B	2, R	9½, 9½	C, E	P	½, ½	Mather	7, 8	36½x1¼-50x2¼	L	Lavine	36, 0	W, E & O.	113	31x4p-31x4p	2,200	45, 75	2
3	B			2, R		E, E	P	½, ½							W	100	31x4-31x4			3
4	B, Timken			2, R		C, E	P									108	32x4-32x4			4
5	B			2, R					Detroit						W	114	33x4p-33x4p			5
6				2, R		E,	P	C, T							W	86	36x3½p-36x3½p			6
7	B, Peru, 3050		B	2, R	9½, 8½	E, C	P	½, C		6, 9	36x1¼-51x2	L	Ditweiler		W	108	30x3½p-30x3½p			7
8	W, Sheldon, W500	Y	W	2, R	11, 10½	E, E	P	½, ½	Shelden	8, 7	38x2-50x2	L	Jacox	30, 10	W, Hoopes	108	31x4p-31x4p	2,120	40, 70	8
9	B	Y	B	2, R	10, 10	C, E	P	½, ½		7, 8	36x2-50x2	L			W	114	32x4p-32x4p	1,900	60, 70	9
10	B	Y		2, R		C, E	P	½, ½		8, 10	36x2-46x2	L	C. A. S.		W	118	32x4p-32x4p			10
11	B, Std Pts, 3070	Y	B	2, R	10, 12	C, E	P, Detroit	½, ½	Mather	7, 9	36x2-50x2½	L	Ross	48, 0	W, Wayne	125	34x4½p-35x5p	2,660	—, 80	11
12	I, Torbensen, OX2	Y	B	2, R	9½, 10½	C, E	P, Savage	½, ½	Iron City	7, 9	36x2-48x2½	L	C.A.S.	44, 0	W, E & O.	124	32x4½p-32x4½p	2,800	50, 60	12
13	I			2, R				½, ½	Tuthill						W	120	34x4p-34x4p			13
14	I, Torbensen			2, R		C, E	P	½, ½	Spring Perch			L	Jacox		W, Auto	128	35x5p-35x5p			14
15	B, Own			2, R		E, E	R, Own	½, ½	Tuthill			L	Own			104	28x3p-28x3p			15
16	C, Sheldon			2, R					Sheldon						W	96	34x2-36x2½			16
17	B, Own	N		2, R	10¾, 8½	C, E	P, Smith	½, ½	Detroit	8, 11	38x2½-54x2½	L	Jacox	46, 0	W	132	35x5p-35x5p	2,940	50, 67	17
18	I, Own		B	2, R	10¼, 11½	E, E	P	½, ½		8, 10	41x2½-54x2½	L	Own		W	115	36x3-36x3½	2,900	50, 64	18
19	I, Torbensen, OX2L	Y	B	2, R	12, 13	E, C	P	½, ½	Mather	6, 9	36x2-50x2	L	Lavine		W, E & O.	118	32x4½p-32x4½p	2,200	65, 80	19
20	W, Own	Y	S	2, R	9½, 10	E, E	P, Smith	½, ½	Mather	8, 10	36x2-50x2½	L	Jacox	50, 0	W, Prudden	135	34x4½p-34x4½p	2,900	52, 68	20
21	B, Salisbury		B	2, R		C, E	R, Own	½, ½	Spring Perch			L	C.A.S.		W, Salisbury	112	33x4p-33x4p			21
22	I, Torbensen, OX2	Y		2, R	10½, 12	C, E	P, Smith	½, ½		7, 10	37x2-50x2½	L	Jacox	46, 0	W	128	35x5p-35x5p	2,580	55, 75	22
23	W, Empire, B	Y	W	2, R	13¼, 12	E, E	P, Detroit	½, ½	Cooper	7, 12	38x2½-50x2½	L	C.A.S.	43, 4	W, Bimel	128	35x5p-35x5p	2,800	42, 58	23
24	W, Timken 6352	Y	B	2, R	10, 10½	E, E	P, Parish	½, ½	Perfection	8, 9	38x2-50x2½	L	Lavine		W, Schwarz	125	34x4½p-34x4½p	2,400	75, 75	24
25	B, Own	N	B	2, R	11¾, 9¾	C, E	P, Own	½, ½	Penn		38x2-40x2½	L	Own	44, 0	W	128	34x4½p-34x4½p	2,615	43½, 62½	25
26	I, Clark, AS	Y	B	2, R	10, 10	C, C	P, Hydraulic	½, ½	Detroit	6, 9	37½x2-48½x2½	L	C.A.S.	42, 0	W, Wayne	110	32x4p-32x4p	2,190	53, 66⅔	26
27	B, Salisbury			2, R		E, E		½, ½							W	115	33x4p-33x4p			27
28	I, Clark, AS	Y	B	2, R		C, C	R, Mason	½, ½	Detroit	7, 10	42x2-54x2½	L	Gemmer		W, Hayes	115	35x5p-35x5p	2,600	60, 80	28
29	W, Empire, B	Y	B	2, R	10¾, 11	E, E	P, Parish	½, ½	Sheldon	8, 8	40x2½-50x2½	L	Lavine		W, Hoopes	128	34x4½p-34x4½p			29
30	B, Own	N	B	2, R	9¼, 9	C, E	P	½, ½				L	Own	50, 4	W	133½	34x4½p-34x4½p	2,960	54, 70	30
31	W, Timken, 6352	Y	W	2, R	11, 11	E, E	P, Savage	½, ½	Detroit	8, 12	40x2½-50x2½	L	Ross		W, Bimel	142	36x3½-36x5	3,650	—, 73	31
32	W, Timken, 6352	Y	B	2, R	9, 9½	E, E	P	½, ½	Detroit	7, 11	38x2½-52x2½	L	Ross	54, 0	W, Bimel	130	34x3½-34x5	3,200	51, 80	32
33	I, Torbensen			2, R		C, E	P, Detroit	½, ½	Detroit	9, 13	38x2-54x2½	L	Ross		W	130	32x4-32x4			33
34	I, Torbensen	Y	W, Powrlok	2, R	10¼, 11¼	C, E	R	½, ½	Detroit	8, 11	36x2-52½x2½	L	Lavine		W, Bimel	130	33x4p-32x3½	2,870	—, 66	34
35	I	Y	B	2, R				½, ½			40x2½-50x2½	L			W	132	34x4½p-36x6p			35
36	I, Clark	N	B	2, R	12, 12	C, E	R, Savage	½, ½	Mather	7, 11	40x2½-52½x2½	L	Lavine	44, 0	W, E & O.	144	34x4½p-36x5	3,200	50, 75	36
37	I, Torbensen, A	Y	B	2, R	11, 11¾	C, E	P	½, ½	Perfection	8, 10	39x2½-52x2½	L	Ross	54, 0	W, Schwarz	124	34x3-34x4	2,910	47, 60	37
38	I, Russel			2, R		C, E	P, Parish	½, ½	Alloy			L	Lavine		W, Hayes	121	33x4-34x3½			38
40	W, Timken, 6460	Y	B	2, R	10½, 11	E, E	R, Own	½, ½	Mather	8, 9	40x2½-54x3	L	Gemmer		W, Standard	132	36x3-36x4	3,800	60, 75	40
41	W, Std Pts, 602	N	B	2, R	11, 10	E, E	P, Parish & B	½, ½	Perfection	9, 7	36x2½-52x3	L	Ross		W, Bimel	144	34x3½-34x5	3,500	51, 62	41
42	W			2, R		E, E	P	½, ½					Ross			140	34x4-34x5			42
43	I, Russel, PI300	Y	B	2, R		C, E	R, Own	½, ½	Perfection	8, 10	38x2½-48x3	L	Own		W, St. Mary	120	34x3½-34x4	3,300		43
44	I, Torbensen, A	Y	B	2, R	10, 11½	C, E	P, Detroit	½, ½	Detroit	8, 10	36x2½-50x3	L	Jacox	46, 0	W, Bimel	126	34x3-34x5	2,900		44
45	W, Wis., 800D	Y	W	2, R	10½, 9	E, E	R, Own	½, ½	Iron City	8, 10	36x2½-48x2½	L	Ross	50, 0	W, E & O.	128	34x3½-34x5	3,400	50, 65	45
46	W, Sheldon	Y	W	2, R		E, E	R, Own	½, ½	Mather	8, 10	38x2½-50x2½	L	Ross		W, Bimel	130	34x3½-34x4		70, 70	46
47	W, Own	Y	B	2, R	10½, 10½	E, E	P, Savage	½, ½	Perfection	7, 11	37x2-54x2½	L	Ross	44, 0	W, Prudden	130	34x3½-34x5	3,200	50, 80	47
48	W, Wisconsin			2, R		E, E	P, Savage	½, ½				L	Ross		W, Jones	128	34x3-34x4			48
49	I, Russel, P	Y	B	2, R	10, 12½	C, E	P, Detroit	½, ½	Detroit	8, 10	43½x2½-48x2½	L	Ross	54, 0	W, Hayes	124	35x5p-36x6p	2,770	51, 73	49
50	I, Torbensen OX2L	Y	W	2, R	10, 12	C, C		½, ½	Rowland	8, 12	34½x2½-48x2½	L	Jacox	18, 0	W, Schwarz	115	34x4½p-35x5p	2,400	—, 90	50
51	I, Clark			2, R		C, C	P, Savage	½, ½	Sheldon			L	Ross		W, Bimel	120	36x3½-36x4			51
52	W, Timken, 6352	N	B	2, R	13, 12	E, E	P	½, ½	Mather	7, 8	40x2½-52x2½	L	Gemmer	46, 9	S, Detroit	132	35x5p-36x6p	3,600	55, 70	52
53	W, Own	N	W	2, R	10¾, 8½	C, E	P, Parish & B	½, ½	Own	7, 9	31⅝x1½-16½x3	L	Own	46, 0	W	124	30x3p-32x3½	1,465		53
54	I			2, R		C, C	P								W					54
55	W, Timken			2, R		E, E	P, Parish	½, ½	Merrill			L	Gemmer		W, Standard	136	35x5p-35x5p			55
56	W, Timken, 6352	Y	W	2, R	12¼, 11½	E, E	P	½, ½	Tuthill	8, 11	40x2½-52x2½	L	Ross	42, 0	W, Prudden	130	36x3½-36x4	3,200	50, 20	56
57	W, Sheldon, W1500	Y	B	2, R	13, 9¾	E, E	P, Hydraulic	½, ½	Mather	6, 9	38x2-48x2½	R	Jacox		W, Wayne	130	34x3½-34x5	2,950	50, 68	57
58	B, Own	N	B	2, R	10¾, 8¾	E, E	P	½, ½	Detroit	8, 11	38x2½-54x2½	L	Jacox	46, 0	W	132	35x5p-35x5p	2,760	50, 67	58
59	I, Torbensen			2, R			P, Parish	½, ½	Delaney				Lavine		W	127	34x3-34x4			59
60	W, Timken			2, R		E, E	P, Parish & B	½, ½	Spring Perch			L	Gemmer		W, Standard	136	35x5p-35x5p			60
61	W, Sheldon			2, R		E, E	P, Own	½, ½	Perfection				Lavine		W, Prudden	115	35x5-35x5			61
62	W, Sheldon			2, R		E, E	P, Detroit	½, ½	Sheldon				Lavine		W	120	32x4-33x4½			62
63	W, Chicago			2, R		E, E	P, Parish & B	½, ½	Iron City			L	Ross		W, Wayne	128	34x3½-34x4			63
64	I, Own		B	2, R	10½, 11½	E, E	P	½, ½		10, 12	40½x2½-54x2½	L	Own		W	128	36x3½-36x4	3,000	50, 64	64
65	I, Russel, O	Y	S	2, R	11½, 11½	C, E	P, Hydraulic	½, ½	Champion	9, 11	37x2½-51½x2½	L	C.A.S.	40, 0	W, Prudden	130	34x3½-34x4	3,400	20, 80	65
66	W, Timken, 6460	Y	W	2, R	9, 9	E, E	R	½, ½	Betts	7, 11	44x2½-52x3	R	Ross		W, W't'rh'se	130	34x3½-34x5	4,300	50, 75	66
67	W, Timken, 6352	N	B	2, R		E, E	P, Parish	½, ½	Merrill	7, 10	40x2-52x2½	L	Ross		W, Schwarz	138	34x3½-34x5	3,500	47, 70	67
68	W, Timken, 6460	N	B	2, R		E, E	R	½, ½	Tuthill	9, 12	39x2½-50x2½	L	Ross		W, Standard	130	34x3½-34x4	3,600		68
69	W, Chicago, C	Y	B	2, R	10½, 10	E, E	P, Parish & B	½, ½	Cleveland	7, 8	36x2-50x3	L	C.A.S.		W, E & O.	130	34x2½-34x4	2,850	50, 75	69
70	I, Clark, AS	N	B	2, R	14, 14	C, C	R, Own	½, ½	Mather	8, 10	35x2-46x2½	L	Lavine	48, 0	W, Royer	133	35x5p-35x5p	3,200	50, 65	70
71	I, Clark, 1	Y	W	2, R	9¼, 9¼	C, C	P, Own	½, ½	Alloy	10, 12	37⅜x2½-52x2½	L	Jacox	47, 0	W, Auto	130	34x3-34x4	3,400	44, 67½	71

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2,000 (National)—3,000 (Kearns) INTERNAL-COMBUSTION

Line no.	Brand name and model name or number	Price f. o. b. factory with seat and tires but without body.	Make of engine and model number.	Number of cylinders.	Bore and stroke, and N. A. C. C. horse-power.	Lubrication (Forced-feed, Splash).	Make of gov-ernor (None).	Water-circulation (Pump, Thermo-siphon).	Radiator (Cellular, Tubular) and make.	Radiator guard included in price? (Yes or No)	Make of carbu-reter.	Fuels (Distillate, Gasolene, Kerosene).	Ignition (Battery, Magneto) and make of magneto.	Electric starting and lighting included in price? (Yes or No)	Clutch (Cone, Multiple-disk, Plate) and make.	Transmission (Individual-clutch, Planetary, Sliding-gear) and number of forward speeds.	Make of transmission and model number.	Power take-off included in price? (Yes or No)	Make of univer-sal joints.	Line no.
	2,000 Pds.—Con.																			
72	National, FA		Waukesha, BUX	4	3½x5½-22.5	S	Waukesha	P	C, McKinnon	N	Zenith	G	M, Eisemann	N	M, Brown-L	S, 3	Brown-L, 30	N	Spicer	72
73	Noble, A20		Buda	4	3½x5½-22.5		Pierce	P	T, Chicago		Stromberg		M, Eisemann		M, Fuller	S, 3	Fuller		M & E.	73
74	Ogden, A1		Continental, N.	4	3½x5-22.5	S	Pierce	P	T, Chicago	Y	Rayfield	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 30	N	Acme	74
75	Palmer	1,585	Continental, N.	4	3½x5-22.5	FS	Pierce	P	C, Fedders		Stromberg		M, Bosch		M, Fuller	S, 3	Fuller			75
76	Rainier, R9	2,050	Continental, N.	4	3½x5-19.6	FS	Monarch	T	C, Harrison	N	Zenith	G	M, Simms	N	M, Brown-L	S, 3	Brown-L, 25	Y	Hartford	76
77	Republic, 10		Continental, N.	4	3½x5-22.5	FS	Ruggles	T	C, Own	N	Stromberg	G	M	N	M, Fuller	S, 3	Fuller, TU½	N	Hartford	77
78	Royal	2,400	Wisconsin	4	3½x5-16.9		Monarch	P	T, Kells		Stromberg		M, Bosch		P, Borg & B	I, 3	Own			78
79	Sandow, G	1,895	Continental, N.	4	3½x5-19.5	S	N	T	T, Chicago	Y	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU½	N	Spicer	79
80	Service, 220	2,415	Buda, RU	4	3½x5½-19.6	FS	N	T	T, Long	N	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU	N	Arvac	80
81	Signal, F	2,750	Continental, C4	4	4½x5½-27.2	FS	Pierce	P	T, McCord	Y	Stromberg	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 35	N	Spicer	81
82	Southern, 10	1,875	Buda, RU	4	3½x5½-19.6	FS	Pierce	T	T, Standard	N	Zenith		M, Bosch	N	P, Borg & B	S, 3	Fuller	N	Spicer	82
83	Standard, 56		Continental, N.	4	3½x5-22.5	FS	Monarch	P	T, Long	Y	Stromberg	G	M, Eisemann	N	M, Brown-L	S, 3	Brown-L, 30	N	Spicer	83
84	Stewart, 12	1,655	Continental, N.	4	3½x5-19.6	FS	N	T	T, Bush	N	Zenith	G	M, Eisemann	N	P, Borg & B	S, 3	Durston, 02800	N	Hartford	84
85	Superior, D	1,600	Continental, N.	4	3½x5-22.5	F	Pierce	T	C, Ideal	Y	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU½	Y	Arvac	85
86	Transport 20	1,850	Continental, N.	4	3½x5-22.5	FS	Simplex	T	C, Spirex	Y	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU½	N	Hartford	86
87	Traylor, B	2,075	Buda, WU	4	3½x5½-22.5	F	Pierce	P	T, G & O	N	Zenith	G	M, Dixie	N	M, Covert	S, 3	Covert	N		87
88	Vim, 22	2 195	Hercules	4	3½x5-22.5	F	N	P	T, McCord	N	Zenith	G	M, Dixie	N	M, Brown-L	S, 3	Brown-L, 30	N	Spicer	88
88a	White Hickory, E	2,350	Continental, N.	4	3½x5-22.5	FS	Simplex	P	T, Chicago	Y	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU½	N	M & E.	88a
88b	Wichita, K	2,350	Own	4	3½x5-19.6	S	N	T	C, Perfex	Y	Stromberg	G	M	N	C	I, –	Cotta	N	Thermoid	88b
89	Wilcox, A		Buda, QU	4	3½x5½-22.5	S	Pierce	P	T, Long	N	Stromberg	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 30	N		89
90	Witt-Will, N	2,000	Continental	4	3½x5-22.5		Pierce	P	C, Bremer		Zenith		M, Eisemann	N	M, Brown-L	S, 3	Brown-Lipe		Spicer	90
	2,500 Pounds:																			
91	Garford, 25	2,090		4	3½x5½-22.5	S	Monarch	P	T, Own	N	Stromberg	G	M, Splitdorf	N	M	S, 3		N		91
92	Hahn, C	1,950	Continental C4	4	4½x5½-27.2	FS	Pierce	P	T, Chicago		Stromberg		M, Bosch		M, Brown-L	S, 3	Brown-L			92
93	Indiana, 12	2,125	Waukesha, BUX	4	3½x5½-22.5	F	Waukesha	P	T, Long	Y	Stromberg	G	M, Eisemann	N	P, Borg & B	S, 3	Covert, G1	N	Acme	93
94	Koehler, C	1,985	Herc'l-Spil. 7000	4	3½x5-19.6	F	Simplex	T	C, Gordon	Y	Zenith	G	M, Eisemann	N	P, Mechanics	S, 3	Mechanics, LU	N	Kinsler-B	94
95	Old Hickory, W	2,175	Continental, N.	4	3½x5-22.5	FS	Pierce	T	T, Long		Stromberg		M, Eisemann		P, Borg & B	S, 3	Grant-Lees, 515			95
96	Rock Falls, 9	3,500	Buda	6	3½x5½-29.5		N	P	C, Sparks-W		Rayfield		M, Bosch	Y	P, Borg & B	S, 3	Grant-Lees		Spicer	96
	3,000 Pounds:																			
97	Acason, RB	2,650	Waukesha, BUX	4	3½x5½-22.5	F	Waukesha	P	C, National	Y	Marvel	G	M, Eisemann	N	M, Fuller	S, 4	Fuller, GU	N	Blood	97
98	Ace, C		Buda, WU	4	3½x5½-22.5	F	Pierce	T	C, Modine	Y	Schebler	G	B, Westingh'e	Y	M, M & E	I, 3	Cotta, AA	N	M & E.	98
99	Acme, F	2,375	Continental, N.	4	3½x5-22.5	FS	Duplex	T	T, G & O	N	Rayfield	G	M, Eisemann	N	P, Borg & B	I, 3	Cotta, BUC	N	Blood	99
99a	All-American	2,195	Herschell-Spill'n	4	3½x5-19.6	FS		T			Stromberg		M, Simms		M	I, 4	Cotta			99a
100	Apex, D	1,595	Buda, RU	4	3½x5½-19.6	FS	N	T	C, Candler	N	Stromberg	G	B, Auto-Lite	N	M, Fuller	I, 4	Fuller, GU½	N	Detroit	100
100a	Available, H1½	2,550	Hercules, CU3	4	4x5½-25.6	FS	Pierce	P	T, Chicago	Y	Stromberg	G	M, Bosch	N	M, Brown-L	I, 4	Cotta, A	N	M & E.	100a
101	Beck, A	1,750	Continental	4	3½x5-22.5	S	Pierce	T	C, Ideal	Y	Stromberg	G	M, Bosch	N	M, Fuller	S, 3	Fuller, TU½	Y	Blood	101
102	Bell		Buda, CTU	4	3½x5½-22.5	F	Duplex	P	T, Chicago	Y	Stromberg	G	M, Eisemann	N	P, Borg & B	S, 3	Detroit, DX	Y	Universal	102
103	Bessemer, H2	2,445	Continental, N.	4	3½x5-22.5	S	Pierce	T	C, Standard	N	Zenith	G	M, Bosch	N	P, Borg & B	S, 3	Brown-L, 35	N	Arvac	103
104	Bethlehem, G		Own	4	4x5½-25.6	F	Pierce	T	C, Livingston	N	Zenith	G	M, Bosch	Y	P, Borg & B	S, 3	Detroit, DY	N	Universal	104
105	Brockway, S2	2,100	Continental, N.	4	3½x5-22.5	S	N	T	T, Bush	N	Stromberg	G	M, Eisemann	N	M, Brown-L	S, 3	Brown-L, 30	N	Spicer	105
106	Chicago, C1½	2,750	Hercules, CU2	4	3½x5½-22.5	F	N	P	T, Own	N	Stromberg	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 30	N	Peters	106
107	Clydesdale, 42	2,750	Continental, N.	4	3½x5-22.5	S	Own	T	T, Own	Y	Zenith	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 30	N	Spicer	107
108	Collier, 19		Continental	4	3½x5-22.5		Monarch	P			Zenith		M, Eisemann		M, Fuller	S, 3	Fuller			108
109	Comet, 1-T-2	1,950	Lycoming	4	3½x5-19.6	S	N	T	C, Standard	Y	Carter	G	B, Dyneto	Y	P, Borg & B	S, 3	Muncie, T25	Y	Arvac	109
110	Commerce, EP	2,255	Continental, N.	4	3½x5-22.5	S	N	T	T, Long	N	Zenith	G	M, Eisemann	N	C, Detroit	S, 3	Detroit, C	N	Spicer	110
111	Concord, A	2.350	Buda	4	3½x5½-22.5		Monarch	P	T, Bush		Zenith		M, Eisemann		M, Brown-L	S, 3	Brown-Lipe		Spicer	111
112	Corbitt, D	2,600	Continental, N.	4	3½x5-22.5	FS	Duplex	T	T, McCord	N	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller	N	Hartford	112
113	Dart, S	2,250	Buda, WU	4	3½x5½-22.5	F	Pierce	T	C, Own	N	Zenith	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU	Y	Spicer	113
114	Day-Elder, B	2,075	Continental	4	3½x5-22.5		Monarch	T	T, Bush		Zenith		M, Berling		M, Covert	S, 3	Covert		Spicer	114
115	Dearborn, F	1,980	Continental, N.	4	3½x5-19.6	F	N	T	T, Chicago	Y	Stromberg	G	M, Bosch	N	M, Fuller	S, 3	Fuller, TU½	N	Hartford	115
116	Defiance, D		Continental	4	3½x5-22.5		N	P	C, Perfex		Stromberg			Y	P, Borg & B	S, 3	Grant-Lees			116
117	Dependable, C	2.150	Buda, CTU	4	3½x5½-22.5	F	Pierce	P	T, Long	N	Zenith	G	M, Dixie	N	M, Fuller	S, 3	Fuller, LTU	N	Acme	117
118	Diamond T, T	2.80)		4	3½x5½-22.5	F		P	T, G & O	N	Stromberg	G	M, Bosch	N	M	S, 3		N	So'd & Sp.	118
118a	Douglas, G	1,975	Weidely	4	3½x5-22.5	F		P	Own		Schebler		M, Eisemann		P, Borg & B	S, 3	Grant-Lees		Arvac	118a
119	Duplex, A	2,575	Hinkley, HAA	4	4x5½-25.6	FS	N	P	T, Modine	N	Stromberg	G	B	Y	M, Covert	S, 3	Covert, MUC	Y	Peters	119
120	Erie			4	4½x5½-27.2		Pierce	T			Stromberg		M, Bosch		M	4				120
121	Fageol		Lycoming, K	4	3½x5-19.6	S	N	P	C, Modine	N	Zenith	DG	M, Dixie	N	P, Borg & B	S, 5	Own	Y	Detroit	121
122	Federal, TE	2.600	Continental, C4	4	4½x5½-27.2	FS	Pharo	P	T, McCord	Y	Zenith	G	M, Eisemann	N	P, Borg & B	S, 4	Detroit, TUE	N	Spicer	122
123	Forschler, AX	2.375	Continental	4	3½x5-19.6		Duplex	P	T, Own		Zenith		M, Bosch		M, Fuller	S, 3	Fuller		Own	123
124	Gary, GT	2.550	Buda, TU	4	4x5½-25.6	F	McCanna	P	T, Chicago	Y	Master	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU3	N	Blood	124
125	Giant, 15	2.425	Continental, N.	4	3½x5-22.5	FS	N	T	C, Ideal	N	Schebler	G,K	M, Eisemann	N	M, Brown-L	S, 3	Brown-L, 30	N	Spicer	125
126	GMC, 31A	2.670	Continental, N.	4	3½x5-22.5	FS	Monarch	P	T, Own	N	Marvel	G	M, Eisemann	N	M, Own	S, 4	Own	N	Own	126
127	Graham, A	2.295	Continental	4	3½x5-22.5	FS	Monarch	T	T, Long		Stromberg		M, Eisemann		M, Fuller	S, 3	Fuller	N	Kinsler-B	127
128	Gramm-B'nst'n, 15 (int.)	2.250	Continental, N.	4	3½x5-22.5	FS	N	T	T, Own	N	Stromberg	G	B, Northeast	N	M, Fuller	S, 3	Fuller	N	Own	128
129	Gramm-B'nst'n, 65 (w'm)	2.775	Continental, N.	4	3½x5-22.5	FS	N	T	T, Own	Y	Stromberg	G	B, Northeast	N	M, Fuller	I, 3	Own	N	Own	129
131	Grant, 17		Continental, N.	4	3½x5-22.5	S	Pierce	T	C, Fedders	N	Carter	G	M, Splitdorf	Y	P, Borg & B	S, 4	Brown-L, 35	N	Peters	131
132	Harvey, WEA	2.550	Buda	4	4½x5½-27 2		Monarch	P	T, Chicago		Zenith		M, Bosch		M, Fuller	S, 3	Fuller		Arvac	132
133	Hawkeye, K	2.150	Buda	4	3½x5½-22.5		Simplex	P	T, Ideal		Zenith		M, Eisemann		M, Fuller	S, 3	Fuller		Hartford	133
134	Huffman, C (int.)	1,695	Continental	4	3½x5-22.5	F		T	C		Zenith		M, Dixie		M, Fuller	S, 3	Fuller			134
135	Huffman, B (worm)	1,895	Continental	4	3½x5-22.5	F		T	C		Zenith		B, Northeast		M, Fuller	S, 3	Fuller			135
136	Hurlburt, A	2.850	Buda, IU	4	4x5½-25.6	FS	Duplex	P	T, Own		Flechter		M, Eisemann	N	M, Brown-L	S, 3	Brown-Lipe			136
137	Independent (Iowa)	1.890	Continental, N.	4	3½x5-22.5	FS			T, Chicago		Stromberg		M, Bosch		M, Fuller	S, 3	Fuller			137
139	International, K	2,300	Own	4	3½x5½-19.6	FS	Own	P	T, Long McC	Y	Holley	G	M, Bosch	N	M, Own	S, 3	Own	N	Own	139
140	Jumbo, 15		Buda, CTU	4	3½x5½-22.5	F	N	P	T, Own	Y	Zenith	G	B, Northeast	Y	M, Fuller	S, 3	Fuller, LTU-S	Y	Arvac	140
141	Kalamazoo, G		Continental	4	3½x5-22.5	F	Pierce	P	T, G & O	Y	Stromberg	G	M, Bosch	Y	M, Fuller	S, 4	Fuller, G5	N	Acme	141
142	Kearns, N	2.000	Herc'l-Spill. 7000	4	3½x5-19.6	FS	Pierce	T	B, Bush	N	Zenith	G	M, Berling	N	P, Borg & B	S, 3	Grant-Lees, 515	Y	Peters	142

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TRUCK SPECIFICATIONS

2,000 (National)—3,000 (Kearns)

Line no.	Final drive (Bevel, Chain, Internal-gear, Spur-and-bevel, Worm) and make of rear axle and model number.	Hotchkiss drive? (Yes or No)	Differential (Bevel, Spur, Worm) and make.	Number and location of driving-wheels (Front, Rear).	Clearance under front and rear axles.	Service and emergency brakes (Contracting, Expanding).	Frame material (Pressed-steel, Rolled-steel) and make.	Front and rear springs (Cantaliver; 1-2, 3-4, or Full elliptic; Transverse).	Make of springs.	Leaves in front and rear springs.	Length and width of of front and rear springs.	Driver's position (Left, Right).	Make of steering gear.	Turning-circle diameter (feet and inches).	Wheels (Iron, Steel, Wood) and make.	Wheel-base (standard).	Front and rear tire sizes (dual, pneumatic).	Weight of chassis (pounds).	Perc. of weight on rear axle when empty & when loaded.	Line no.
72	W, Timken, 6352..	Y	W	2, R	10½, 10½	E, E	P.....	½, ½	Coghlin....	8, 10	40x2½-52x2½...	L	Ross.....	3', 0	W, Hayes..	136	34x3½-34x3½.....	3,350	.....	72
73	W, Sheldon.....	.....	.....	2, R	.....	E, E	P, Parish & B..	½, ½	Tuthill.....	.....	.....	L	Lavine.....	.....	W, Bimel..	144	36x3½-36x4.....	.....	.....	73
74	W, Timken, 6460..	Y	S	2, R	10 , 10	E, E	P, Garden City	C, C	Tuthill.....	8, 10	38x2½-50x2½...	L	Gemmer..	.....	W, Standard	136	36x3½-36x4.....	3,400	—, 70	74
75	I, Torbensen.....	.....	.....	2, R	.....	.....	P, Parish & B..	.....	Champion....	.....	.....	.....	Ross.....	.....	W.....	132	34x3½x34x4.....	.....	.....	75
76	W,Sheldon, W1500	Y	B	2, R	9½, 10	E	E P, Parish.....	½, ½	Perfection..	8, 13	38x2-50x2½....	L	Lavine.....	.....	W, Schwars.	125	32x3½-32x4.....	2,750	75, 75	76
77	I, Torbensen, A...	Y	B	2, R	.....	C, E	P, Detroit.....	½, ½	Mather.....	7, 11	39x2½-52½x2½..	L	Jacox.....	.....	W.....	124	34x3-34x4.....	2,925	.....	77
78	W, Timken.....	.....	.....	2, R	.....	E, E	R, Own.....	.....	Merrill.....	.....	.....	.....	Ross.....	.....	W.....	128	34x4-34x5.....	.....	.....	78
79	W,Sheldon, W1500	Y	W	2, R	9½, 9	E, E	P, Savage.....	½, ½	Garden City	7, 10	36x2½-52x2½...	L	Ross.....	48, 0	W, Standard	120	34x3½-34x5.....	3,300	20, 70	79
80	W, Timken, 6456..	Y	B	2, R	9½, 9	E, E	P.....	½, ½	Mather.....	8, 9	40x2½-50x2½...	L	Ross.....	42, 0	W, Bimel...	137	34x3½-34x5.....	3,470	—, 70	80
81	W, Timken, 6460..	N	B	2, R	11 , 11	E, E	P, Savage.....	½, ½	Detroit.....	10, 11	44x2½-56x3....	L	Ross.....	53, 0	W, Hayes..	144	34x3½-36x5.....	4,395	—, 70	81
82	W, Sheldon.....	Y	W	2, R	10 , 11	.....	P, Parish & B..	.....	Mather.....	.....	3 x2½-5'x2½...	L	Ross.....	.....	W, Royer...	130	35x3p-35x5.....	.....	.....	82
83	W, Timken, 6352.	Y	B	2, R	10 , 11½	E, E	P, Parish.....	½, ½	Perfection..	.....	39½x2½-53½x2½..	L	Ross.....	.....	W.....	134	34x3½-34x4.....	3,220	58, 71	83
84	I, Clark, 1D.....	Y	B	2, R	10 , 10	C, C	P.....	½, ½	Detroit.....	8, 11	38½x2-50x2½...	L	Ross.....	45, 0	W, Wayne..	130	34x3½-34x4.....	2,820	53, 70	84
85	I, Torbensen, A...	Y	B	2, R	11 , 11½	C, E	P.....	½, ½	Tuthill.....	8, 11	37½x2-44x2½...	L	C.A.S....	36, 0	W, Schwars.	124	34x4½p-34x5p.....	2,950	75, —	85
86	I, Clark, 1D	Y	B	2, R	10½, 11½	C, E	P, Detroit.....	½, ½	Detroit.....	8, 10	39x2½-52½x2½..	L	Jacox.....	.....	W.....	130	35x5p-36x6p.....	3,100	50, 70	86
87	W,Sheldon, W1501	Y	W	2, R	.....	E, E	P, Savage.....	½, ½	.....	.....	36x2½-48x2½...	L	Ross.....	.....	W,Schwars.	132	34x3½-34x5.....	3,500	.....	87
88	W,Sheldon, W1501	Y	W	2, R	12½, 11	C, E	P.....	½, ½	Sheldon....	9, 12	40x2½-54x2½...	L	Jacox.....	35, 0	W,Hoopes..	125	35x5p-35x5p.....	3,350	40, 70	88
88a	W Timken 6352..	Y	W	2, R	11½, 11½	E, E	P, Parish & B..	½, ½	Sheldon....	8, 10	38x2-52x2½...	L	Lavine.....	44, 0	W. Bimel...	124	35x5p-35x5p.....	3,150	.....	88a
88b	W, Sheldon.....	Y	W	2, R	10½, 10½	E, E	P, Own.....	½, ½	Detroit....	.....	.....	R	Ross.....	.....	W.....	144	36x3-36x4.....	.....	.....	88b
89	W, Wis., 800D....	Y	B	2, R	.....	E, E	P.....	½, ½	Sheldon....	9, 11	36x2½-50x2½...	L	Gemmer....	.....	I, Smith....	130	35x5p-35x5p.....	3,600	25, 75	89
90	W. Timken.....	.....	.....	2, R	.....	E, E	P, Parish.....	½, ½	Delaney.....	.....	.....	L	Ross.....	.....	W,Archibald	120	36x3½-36x4.....	.....	.....	90
91	W.....	Y	B	2, R	.....	E, E	P.....	½, ½	.....	8, 8	42x2½-50x2½...	L	Ross.....	50, 0	W.....	135	36x3½-36x4.....	3,900	.....	91
92	W, Timken.....	.....	.....	2, R	.....	.....	P, Parish.....	.....	Delaney.....	.....	.....	.....	Lavine.....	.....	.....	135	36x3½-36x5.....	.....	.....	92
93	W,Sheldon, W1501	N	B	2, R	10 , 8½	E, E	R, Illinois....	F, ½	Sheldon....	8, 9	38x2-50x2½....	L	Wohlrab..	44, 0	W, Bimel...	131	34x3½-34x5.....	4,100	55, 65	93
94	I, Torbensen, A...	Y	B	2, R	.....	C, E	P, Parish & B..	½, ½	Mather.....	8, 13	38x2½-54x2½...	L	Own	.....	W, Wayne..	131	34x3-34x5.....	3,300	.....	94
95	W, Timken, 6453..	.....	.....	2, R	.....	E, E	R, Own.....	½, ½	Standard....	.....	.....	.....	Lavine.....	.....	W,Standard	135	36x3½-36x4.....	.....	.....	95
96	B, Columbia.....	.....	.....	2, R	.....	C, E	P, Smith.....	½, ½	Tuthill.....	.....	.....	L	Gemmer....	.....	W, Mutual.	150	35x5p-35x5p.....	.....	.....	96
97	W, Timken, 6460..	Y	W	2, R	11 , 11	E, E	P, Savage.....	½, ½	Detroit.....	8, 12	40x2½-50x2½...	L	Ross.....	.....	W, Bimel...	142	36x3½-36x6.....	3,800	—, 74	97
98	W, Timken, 6460..	Y	W	2, R	10 , 11	E, E	P, Parish & B.	½, ½	Mather.....	9, 9	39½x2½-53½x3..	L	Ross.....	.....	W,Schwars.	144	36x6p-38x7p.....	4,750	50, 80	98
99	W, Timken, 6460..	Y	B	2, R	9 , 9½	E, E	P.....	½, ½	Detroit.....	8, 12	38x2½-52x2½...	L	Ross.....	54, 0	W, Bimel...	141	34x3½-34x5.....	3,700	51, 80	99
99a	I, Torbensen.....	.....	W, Powrlok	2 R	.....	E, E	P.....	½, ½	.....	10, 12	0x2½-51x3.....	.....	.....	.....	W.....	144	34x4-34x5.....	.....	.....	99a
100	I, Torbensen.....	Y	B	2, R	10½, 11½	C, E	R.....	½, ½	Detroit.....	8, 12	36x2-52½x2½...	L	Lavine.....	.....	W, Bimel...	130	32x3½-32x4.....	3,070	—, 66	100
100a	W, Wisconsin.....	N	B	2, R	9½, 9½	E, E	R, Own.....	½, ½	Tuthill.....	8, 10	40x2½-50x3....	L	Ross.....	42, 0	W,St.Mary's	152	36x3½-36x5.....	4,000	55, 75	100a
101	I, Clark, 1B.....	N	B	2, R	14 , 13	C, E	P, Parish & B..	½, ½	Higgins....	7, 12	40x2½-52x2½...	L	Lavine...	48, 0	W, Bimel...	132	35x5-35x5.....	2,800	30, 75	101
102	I, Russel.....	Y	B	2, R	12 , 13	C, E	R, Own.....	½, ½	Detroit....	7, 12	40x2-54x2½....	L	Gemmer..	52, 0	W, Bimel...	132	32x3½x32x4.....	3,500	50, 70	102
103	I, Torbensen, C...	N	B	2, R	11 , 12	C, E	P.....	½, ½	Perfection..	8, 11	39x2½-56x3....	L	Ross.....	51, 0	W, Schwars.	144	36x3½-36x5.....	3,600	53, 65	103
104	I, Russel, PI300..	Y	B	2, R	10½, 11½	C, E	P, Detroit.....	½, ½	Mather	9, 10	40x2½-52½x3..	L	Lavine...	48, 0	W, Wayne..	135	34x3½-34x5.....	3,530	—, 90	104
105	W,Sheldon, W1501	N	B	2, R	.....	E, E	P, Parish & B..	½, ½	Sheldon....	7, 10	39x2½-48x3....	L	Gemmer....	.....	W, Hoopes.	140	36x3½-36x5.....	3,550	52, 74	105
106	W, Timken, 6460..	Y	B	2, R	10½, 11	E, E	R.....	½, ½	Mather.....	8, 11	40x2½-54x3....	L	Gemmer....	.....	W, Standard	144	36x3½-36x5.....	3,900	60, 75	106
107	W, Timken, 6460..	N	B	2, R	10½, 10	E, E	P, Parish & B..	½, ½	Perfection..	9, 9	36x2½-52x3....	L	Ross.....	.....	W, Bimel...	146	36x3½-36x6.....	3,750	51, 78	107
108	W.....	.....	.....	2, R	.....	E, E	.....	½, ½	.....	.....	.....	.....	Ross.....	.....	.....	144	36x4-36x6.....	.....	.....	108
109	B, Standard, C....	Y	B	2, R	10 , 12	C, E	P.....	½, ½	Marathon..	7, 12	36½x2-50½x3...	L	Gemmer....	56, 0	W, Moline..	130	33x4p-33x4.....	3,240	60, 70	109
110	I, Torbensen, A...	Y	B	2, R	11, 12½	C, E	P, Detroit.....	½, ½	Detroit.....	8, 11	36x2½-50x3....	L	Jacox.....	50, 0	W, Bimel...	134	36x6p-36x6p.....	3,200	.....	110
111	W, Timken.....	.....	.....	2, R	.....	E, E	P, Parish & B..	½, ½	Spring Perch	.....	.....	L	Ross.....	.....	W, Crane...	140	36x3½-36x5.....	.....	.....	111
112	W, Sheldon.....	Y	W	2, R	.....	E, E	R, Own.....	½, ½	Mather.....	9, 11	38x2½-50x2½...	L	Ross.....	.....	W, Bimel...	136	36x3½-36x5.....	.....	.....	112
113	W, Own.....	Y	B	2, R	10½, 10½	F, F	P, Savage.....	½, ½	Perfection..	7, 11	37x2-54x2½....	L	Ross.....	44, 0	W, Prudden	140	34x3½-34x5.....	3,300	50, 80	113
114	W, Wisconsin.....	.....	.....	2, R	.....	E, E	P, Savage.....	½, ½	Iron City...	.....	.....	L	Ross.....	.....	W, Jones...	144	35x3½-34x5.....	.....	.....	114
115	W, Chicago, C....	Y	B	2, R	10, 12	E, E	P, Own.....	½, ½	Maremont...	7, 9	35x2½-52x2½...	L	Lavine...	42, 0	W, Crane...	126	34x4-34x5.....	3,280	50, 75	115
116	I, Torbensen.....	.....	.....	2, R	.....	E, E	P, Detroit.....	½, ½	Detroit.....	.....	.....	L	.....	.....	W, Crane...	140	35x5-36x6.....	.....	.....	116
117	W, Wisc., 800H...	Y	W	2, R	10, 10	E, E	P.....	½, ½	Perfection..	9, 11	40x2½-48x2½...	L	Ross.....	54, 0	W, Bimel...	128	34x5-34x5.....	4,120	40, 70	117
118	W.....	Y	W	2, R	.....	E, E	P.....	½, ½	Mather....	8, 10	40x2½-53x2½...	L	Gemmer....	.....	W, Prudden	144	36x3½-36x5.....	4,000	50, 90	118
118a	I, Torbensen.....	.....	.....	.....	.....	.....	.....	.....	Own.....	.....	.....	.....	Ross.....	.....	.....	127	34x3½-34x5.....	3,725	.....	118a
119	W, Sheldon.....	Y	B	2, R	11, 11½	E, E	P, Parish & B..	½, ½	Penn.....	9, 9	39x2½-50x2½...	L	Ross.....	.....	W, Prudden.	145	35x5p-38x7p.....	.....	.....	119
120	W, Timken.....	.....	.....	2, R	.....	.....	P.....	.....	.....	.....	.....	.....	Ross.....	.....	.....	144	34x3½-36x5.....	.....	.....	120
121	W, Standard, 603.	Y	B	2, R	10½, 10	E, E	R, Own.....	½, ½	Mather....	8, 11	41x2½-56x3....	L	Ross.....	.....	W, Prudden.	136	34x3½-34x6.....	3,500	50, 70	121
122	W, Timken, 6560..	N	B	2, R	12½, 9	E, E	P.....	½, ½	Mather....	9, 9	40x2½-54x3....	L	Gemmer..	46, 3	W, Auto....	144	36x3½-36x5.....	4,250	56, 69	122
123	W, Sheldon.....	.....	.....	2, R	.....	E, E	R, Own.....	½, ½	Own.....	.....	.....	.....	Ross.....	.....	I, Smith....	120	36x3½-36x5.....	.....	.....	123
124	W, Timken, 6460..	Y	W	2, R	12, 10½	E, E	P.....	½, ½	Tuthill.....	9, 12	44x2½-52x3....	L	Ross.....	42, 0	W, Prudden.	142	36x3½-36x5.....	3,800	50, 20	124
125	W,Sheldon,W-1500	Y	B	2, R	13, 9½	E, E	P, Hydraulic...	½, ½	Mather....	6, 11	38x2-48x2½....	R	Jacox.....	.....	W, Wayne..	138	34x3½-34x5.....	3,600	55, 75	125
126	W, Timken, 6460..	N	B	2, R	10½, 9½	E, E	P, Smith.....	½, ½	Detroit.....	8, 10	36x2½-54x3....	L	Jacox.....	51, 0	W.....	130	36x3½-36x5.....	4,205	55, 74	126
127	I,Torbensen.....	.....	.....	2, R	.....	C, C	P.....	.....	.....	9, 12	42x2½-52x3....	L	Lavine.....	.....	S, Disteel..	133	35x5p-36x6p.....	3,400	—,80	127
128	I, Clark.....	Y	B	2, R	11, 11	C, E	P, Own.....	½, ½	Perfection..	10, 11	40x2½-52x2½...	L	Ross.....	51, 0	W, Bimel...	138	36x3½-36x5.....	3,800	69, 90½	128
129	W, Standard.....	Y	B	2, R	11,	E, E	P.....	½, ½	Perfection..	10, 11	40x2½-52x2½...	L	Ross.....	51, 0	W, Bimel...	138	36x3½-36x5.....	4,200	69, 90½	129
131	I, Torbensen, A...	Y	B	2, R	10, 10½	C, E	P.....	½, ½	Perfection..	11, 12	42x2½-50x2½...	L	Jacox.....	45, 0	W, Royer...	140	38x7p-38x7p.....	3,450	47½, 69	131
132	W, Sheldon.....	.....	.....	.....	.....	E, E	P, Own.....	.....	Sheldon....	.....	.....	L	Ross.....	.....	W, Schwars.	128	34x3½-34x5.....	.....	.....	132
133	I, Clark.....	.....	.....	2, R	.....	C, E	R, Own.....	½, ½	Detroit.....	.....	.....	L	Ross.....	.....	W, Bimel...	148½	34x3½-34x5.....	.....	.....	133
134	I, Torbensen.....	.....	.....	2, R	.....	E, C	P.....	½, ½	Perfection..	.....	.....	.....	Lavine.....	.....	W.....	140	34x3½-34x5.....	.....	.....	134
135	W.....	.....	.....	2, R	.....	E, E	P.....	½, ½	Perfection..	.....	.....	.....	Lavine.....	.....	W.....	140	34x3½-34x5.....	.....	.....	135
136	W, Hindley.....	.....	.....	2, R	.....	E, C	P, Savage.....	½, ½	Perfection..	.....	.....	.....	Ross.....	.....	W, Wayne..	148	34x4-34x5.....	.....	.....	136
137	I, Torbensen.....	.....	.....	2, R	.....	C, E	P.....	½, ½	.....	.....	.....	.....	Lavine.....	.....	W.....	135	34x3½-34x5.....	.....	.....	137
139	I, Own.....	.....	B	2, R	10½, 11½	E, E	P.....	½, ½	.....	10, 14	41½x2½-56x3....	L	Own.....	.....	W.....	128	36x3½-36x5.....	3,400	50, 67	139
140	I, Clark, 1D.....	Y	B	2, R	11, 13½	C, E	P.....	½, ½	Perfection..	9, 11	40x2½-52x2½...	L	Jacox.....	35, 0	W.....	144½	36x3½-36x5.....	3,600	50, 75	140
141	W, Wisc., 800F...	N	W	2, R	9, 9½	E, E	R.....	½, ½	Sheldon....	8, 10	40x2½-48x2½...	L	Ross.....	51, 8	W, Bimel...	144	36x4-36x5.....	5,080	—, 80	141
142	I, Torbensen, B...	Y	S	2, R	14, 11	E, E	P.....	½, ½	Mather....	6, 9	42x2½-52x3....	L	Lavine.....	.....	W, E & O..	136	34x3½-34x6.....	3,620	68, 80	142

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3,000 (Kelly-Springfield)—4,000 (Collier) INTERNAL-COMBUSTION

Line no.	Brand name and model name or number	Price f. o. b. factory with seat and tires but without body.	Make of engine and model number.	Number of cylinders.	Bore and stroke, and N. A. C. C. horse-power.	Lubrication (Forced-feed, Splash).	Make of gov-ernor (None).	Water-circulation (Pump, Thermo-siphon).	Radiator (Cellular, Tubular) and make.	Radiator guard included in price? (Yes or No)	Make of carbu-reter.	Fuels (Distillate, Gasolene, Kerosene).	Ignition (Battery, Magneto) and make of magneto.	Electric starting and lighting included in price? (Yes or No)	Clutch (Cone, Multiple-disk, Plate) and make.	Transmission (Individual-clutch, Planetary, Sliding-gear) and number of forward speeds.	Make of transmission and model number.	Power take-off included in price? (Yes or No)	Make of univer-sal joints.	Line no.
	3,000 Pounds—Gas.																			
143	Kelly-Sp'gf'd,K31,(ch'n)	3,000	Own	4	3¾x5½-19.6	F	Pierce	P	C, Long	N	Zenith	G	M, Eisemann	N	C, Own	S, 3	Covert, GI	N	Own	143
144	Kelly-Sp'gf'd,K32,(w'm)	3,000	Own	4	3¾x5½-19.6	F	Pierce	P	C, Long	N	Zenith	G	M, Eisemann	N	C, Own	S, 3	Covert, GI	N	Spicer	144
145	Kissel, General Utility	2,775	Own	4	3¼x5½-24.0	S	Pierce	P	T, Fedders	N	Stromberg	G	M, Eisemann	N	M, Warner	S, 3	Warner, T38	N	Spicer	145
146	Kleiber, A	2,800	Continental, C4	4	4¼x5½-27.2	S	Pierce	P	C, Perfex	N	Stromberg	G	M, Bosch	N	M, Hele-Shaw	S, 4	Brown-L, 50-4	N	Spicer	146
147	K-Z	2,450	Continental, J4	4	3¾x5-22.5	F	Pierce	P	T, Chicago	Y	Stromberg	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 35	N	Thermoid	147
148	Larrabee, N		Continental, N	4	3¾x5-22.5	S	Simplex	T	T, Bush	N	Schebler	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 30	N	Universal	148
149	Macar, L	2,925	Continental, C4	4	4¼x5½-27.2	F	Pierce	P	T, Own	N	Stromberg	G	M, Eisemann	N	M, Brown-L	S, 3	Brown-L, 35	N	Spicer	149
150	Mack, AB(chain)	3,000	Own	4	4x5-25.6	S	Own	P	C, Own	N	Zenith	G	M, Aero	N	M, Brown-L	S, 4	Brown-L	N	Spicer	150
151	Mack, AB(worm)	3,000	Own	4	4x5-25.6	S	Own	P	C, Own	N	Zenith	G	M, Aero	N	M, Brown-L	S, 4	Brown-L	N	Spicer	151
152	Mapleleaf, AA		Hinkley,HAA400	4	4x5½-25.6	FS	Hinkley	P	T, McCord	Y	Stromberg	G	M, Bosch	N	M, Fuller	S, 3	Fuller, LTU5	N	Blood	152
154	Master, JW	2,490	Buda, OU	4	4¼x5½-27.2	S	McCanna	P	T, Own	N	Master	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU3	Y	Spicer	154
155	Maxwell	1,322	Own	4	3¾x4½-21.0	S		T	T, Own	N	Johnson	G	B, Simms	Y	C, Own	S, 3	Own	N	Own	155
156	Menominee, H		Continental, C4	4	3¾x5-22.5	S	Monarch	T	C, G & O	N	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU2	N	Spicer	156
157	Moreland, 19B	2,930	Continental	4	4¼x5½-27.2	FS	N	P	T, Own	N	Master	D	M, Dixie	N	M, Own	S, 4	Own	N	Thermoid	157
158	Myers, 80	1,875	Lycoming	4	3¼x5-19.6	FS	N	T	C, Standard	N	Zenith	G	M, Eisemann	N	P, Borg & B	S, 3	Grant-Lees	N	Universal	158
159	Napoleon, 11		Victory	4	3¼x5-19.6	F	N	T	T, Chicago	Y	Stromberg	G	B	N	M, Fuller	S, 3	Fuller, TU¾	N	Universal	159
160	National, GA		Waukesha, BUX	4	3¾x5½-22.5	S	Waukesha	P	C, McKinnon	N	Zenith	G	M, Eisemann	N	M, Brown-L	S, 3	Brown-L, 30	N	Spicer	160
161	Nelson & LaMoon, F1½		Continental, C4	4	4¼x5½-27.2	FS	Pierce	P	T, Chicago		Stromberg		M, Bosch		M, Brown-L	S, 3	Brown-L, 35		Thermoid	161
162	Noble, B30		Buda	4		FS	Pierce	P	T, Chicago		Stromberg		M, Eisemann		M, Fuller	S, 3	Fuller, LTU			162
163	Norwalk	1,750	Lycoming, K	4	3¼x5-19.6	FS	N		T, Chicago		Carter		B		P, Borg & B	S, 3	Grant-Lees, 515			163
164	O. K., K	2,450	Buda, ITU	4	4¼x5-32.4	FS	Pierce	T	T, R'me-T'r'y		Zenith		M, Eisemann		M, Fuller	S, 3	Fuller, TU3		Hartford	164
165	Old Hickory, N	995	Lycoming, K	4	3¼x5-19.6			T	C, Standard		Carter		M, Connectic		C, Lycoming	S, 3	Grant-Lees			165
166	Old Reliable, A	2,350	Wisconsin, EU	4	4x5-25.6	F	N	P	T, Chicago	Y	Stromberg	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 35	N	Spicer	166
167	Packard, 1¼E	3,200	Own	4	4x5½-25.6	F	Own	P	T, Fedders	N	Own	G	M, Dixie	N	M, Own	S, 4	Own	N	Spicer-Th	167
168	Paige, 52-19			4	4x5½-25.6			P	T	Y	Stromberg	G	M, Bosch	N	M, Brown-L	S, 4	Brown-Lipe	N	Spicer	168
169	Patriot, Lincoln	2,450	Hinkley,HAA400	4	4x5½-25.6	F	Hinkley	P	T, Own	N	Stromberg	G	M, Splitdorf	N	M, Covert	S, 4	Fuller, G5	N	Thermoid	169
170	Rainier, R6	2,150	Continental, N	4	3¾x5-19.6	FS	Monarch	T	C, Harrison	N	Zenith	G	M, Simms	N	M, Brown-L	S, 3	Brown-L, 25	Y	Hartford	170
171	Reliance, A10	2,500	Buda, ITU	4	4x5½-25.6	F	Pierce	P	T, Bush	N	Stromberg	G	M, Eisemann	Y	M, Fuller	S, 3	Fuller, TU3	N	Peters	171
172	Republic, 11X		Continental, N	4	3¾x5-22.5	FS	Ruggles	T	C, Own	N	Stromberg	G	M		M, Fuller	S, 3	Fuller, TU¾	N	Hartford	172
173	Reynolds, 3A	3,250	Own	4	4x5½-26.5	F	Hinkley	P	T, Own	Y	Stromberg	dgk	M, Bosch	Y	M, Own	S, 4	Own	N	Thermoid	173
173a	Rowe, CW	2,800	Wisconsin	4	3¾x5-22.5	F	Simplex	P	—, Fedders		Zenith		M, Bosch			S, 4	Brown-L		Spicer	173a
174	Royal	2,800	Wisconsin	4	3¾x5-22.5		Monarch	P	T, Kells		Stromberg		M, Bosch		P, Borg & B	I, 3	Own			174
175	Sandow, CG	2,190	Continental, N	4	3¾x5-22.5	S	N	P	T, Chicago	Y	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU¾	N	Spicer	175
176	Schwarts, B2	2,175	Continental, J4	4	3¾x5-22.5	F	Pierce	P	C, Fedders	N	Stromberg	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 35	N	M & E	176
177	Seiden, 1½A		Continental, N	4	3¾x5-22.5	S	Pierce	T	T, Long	N	Stromberg	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 30	N	Spicer	177
178	Service, 31 (solids)	2,985	Buda, IU	4	4x5½-25.6	F	Simplex	P	T, Long	N	Stromberg	G	M, Eisemann	N	P, Borg & B	S, 4	Brown-L, 50	N	Spicer	178
179	Service, 36 (pneumatics)	3,415	Buda, HU	4	4¼x5½-28.9	F	Simplex	P	T, Long	N	Stromberg	G	M, Eisemann	N	P, Borg & B	S, 4	Brown-L, 50	N	Spicer	179
180	Signal, H	2,925	Continental, C4	4	4¼x5½-27.2	FS	Pierce	P	T, McCord	Y	Stromberg	G	M, Eisemann	N	M, Brown-L	S, 3	Brown-L, 35	N	Spicer	180
181	Southern, 15		Continental, N	4	3¾x5-22.5	FS	Pierce	T	T, Standard	N	Zenith		M, Bosch	N	P, Borg & B	S, 3	Fuller	N	Spicer	181
182	Sterling	2,850	Own	4	4x5½-25.6	F	Waukesha	P	C, Own	Y	Rayfield	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 35	N	Spicer	182
183	Stewart, 9	2,250	Continental, N	4	3¾x5-22.5	FS	N	T	T, Bush	N	Zenith	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU¾	N	Hartford	183
184	Stoughton, B		Waukesha	4	3¾x5-22.5	F	Waukesha	P	T, Chicago		Stromberg		M, Eisemann		M, Brown-L	S, 3	Brown-Lipe		Thermoid	184
185	Sullivan, F	2,975	Buda, M	4	3¾x4½-22.5	S	N	T	T, Bush	N	Stromberg	G	M, Bosch	N	C, Hartford	S, 3	Covert, GI	N	Hartford	185
186	Texan, TK	1,525	Lycoming	4	3¼x5-19.6	S	N	T	C, Own		Carter		B		P, Borg & B	S, 3	Muncie			186
187	Tiffin, GW	2,415	Continental, C4	4	4¼x5½-27.2	FS	Pierce	P	T, Own	Y	Schebler	G	M, Bosch	N	M, Fuller	S, 3	Fuller, GU3	Y	Peters	187
188	Tower, J	2,820	Continental, C4	4	4¼x5½-27.2	FS	Pierce	P	T, Own	N		G	M	N	M, Fuller	S, 3	Fuller, LTU	N		188
189	Transport, 30	2,250	Continental, N	4	3¾x5-22.5	FS	Simplex	T	C, Spirex	Y	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, LTU4	N	Hartford	189
190	Traylor, C	2,875	Buda, ITU	4	4x5½-25.6	F	Pierce	P	T, G & O	N	Zenith	G	M, Dixie	N	M, Covert	S, 3	Covert	N		190
191	Triangle, A	2,185	Waukesha, BU4	4	3¾x5½-22.5	S	Waukesha	P	T, Perfex	N	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU3	N	Detroit	191
192	Ultimate, A		Buda, ITU	4	4x5½-25.6	F	Pierce	P	T, Own	N	Stromberg	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 35	N	Spicer	192
193	United		Buda	4	3¾x5½-22.5						Stromberg				M	S, 3	Brown-Lipe			193
194	Universal, G		Buda	4	3¾x5-22.5		Monarch	P	T, Bremer		Zenith		M, Eisemann		P, Own	S, 3	Own			194
195	U. S., N	2,150	Continental	4	3¾x5-22.5		Monarch	P	T, Long		Stromberg		M, Eisemann		M, Brown-L	S, 3	Brown-L		Blood	195
196	Velie, 46	1,925	Continental, N	4	3¾x5-22.5	FS	Monarch	P	T, Own	N	Stromberg	G	M, Berling	N	P, Borg & B	S, 3	Durston 034000	N	Arvac	196
197	Victor (Mich.), A		Continental, N	4	3¾x5-22.5	F	N	T	Modine		Stromberg		M, Eisemann		M, Fuller	S, 3	Fuller, LTU	Y	Acme	197
198	Watson, 20		Waukesha, BUX	4	3¾x5½-22.5	S	Waukesha	P	T, R'me-T'r'y	N	Stromberg	G	M, Simms	N	M, Brown-L	S, 3	Brown-L, 35	N	M & E	198
199	White Hickory, H	2,650	Continental, N	4	3¾x5-22.5	FS	Simplex	P	T, Chicago	Y	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU¾	N	Arvac	199
200	Wichita, L	2,600	Waukesha, BX	4	3¾x5-22.5	F	Waukesha	P	C, Perfex	Y	Stromberg	G	M	N	C	I, 3	Cotta	N	Thermoid	200
201	Wilcox, B		Own	4	4¼x5-28.9	S	Pierce	P	T, Long	N	Stromberg	G	M, Bosch	N	C, Own	S, 4	Own	N		201
202	Wilson	2,450	Continental, N	4	3¾x5-22.5	FS	Pierce	T	T, Own	N	Marvel	G	M, Eisemann	N	P, Borg & B	S, 4	Brown-L, 35		Thermoid	202
203	Winther, 39 (rear drive)	2,450	Wisconsin, CAU	4	3¾x5-22.5	F	N	P	T, Bremer	N	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU¾	N	Arvac	203
204	Winther, 430 (4-wh'l-dr)	2,850	Wisconsin, CAU	4	3¾x5-22.5	F	N	P	T, Bremer	N	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, LTU4	N	Peters	204
205	Wisconsin, B	1,750	Waukesha	4	3¼x5½-19.6		Waukesha	P	T, Chicago		Master		M, Eisemann		M, Fuller	S, 3	Fuller			205
206	Witt-Will, N Special	2,150	Continental	4	3¾x5-22.5		Pierce	P	C, Bremer		Zenith		M, Eisemann	N	M, Brown-L	S, 3	Brown-Lipe		Spicer	206
207	Wolverine, C		Continental	4	3¾x5-22.5		Monarch	T	T, Long		Stromberg		M, Eisemann	Y	M, Fuller	S, 3	Fuller		Universal	207
	3,500 Pounds:																			
208	Air-O-Flex, C		Buda, CTU	4	3¾x5½-22.5	P	Duplex	F	T, Spirex	N	Stromberg	G	M, Splitdorf	Y	P, Borg & B	S, 4	Brown-L, 35	N	Thermoid	208
209	Oneida, BA	2,385	Own	4	4x5-25.6	FS	Own	P	T, Modine		Stromberg		M, Bosch		M, Own	I, 3	Own			209
	4,000 Pounds:																			
210	Acme, A	3,050	Continental, C4	4	4¼x5½-27.2	FS	Duplex	P	T, G & O	N	Rayfield	G	M, Eisemann	N	P, Borg & B	I, 4	Cotta, R	N	Blood	210
211	Atco, W20	2,875	Buda, HU	4	4¼x5½-28.9	F	Pierce	P	T, Chicago	Y	Stromberg	G	M, Bosch	N	M, Fuller	S, 4	Fuller, G	Y	Hartford	211
212	Autocar, 21UF	2,300	Own	2	4¼x4½-18.0	S	N	P	T, Own	N	Stromberg	G	M, Bosch	N	P, Own	S, 3	Own	N	Spicer	212
214	Beck, C	2,350	Continental	4	4¼x5½-27.2	F	Pierce	P	C, Ideal	Y	Stromberg	G	M, Bosch	N	M, Fuller	S, 3	Fuller, TU3	Y	Blood	214
215	Belmont, C	2,550	Buda, HU	4	4¼x5½-28.9	F	Pierce	P	T, Chicago	Y	Zenith	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU	N	Sterling	215
216	Brinton, F	3,000	Continental, C4	4	4¼x5½-27.2	FS	Pierce	P	T, Mayo	N	Stromberg	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 50		Spicer	216
217	Collier, 20		Continental	4	4¼x5½-27.2		Monarch	P			Zenith		M, Eisemann		M, Fuller	S, 4	Fuller			217

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TRUCK SPECIFICATIONS

3,000 (Kelly-Springfield)—4,000 (Collier)

Line no.	Final drive (Bevel, Chain, Internal-gear, Spur-and-bevel, Worm) and make of rear axle and model number.	Hotchkiss drive? (Yes or No)	Differential (Bevel, Spur, Worm) and make.	Number and location of driving-wheels (Front, Rear).	Clearance under front and rear axles.	Service and emergency brakes (Contracting, Expanding).	Frame material (Pressed-steel, Rolled-steel) and make.	Front and rear springs (Cantaliver; 1-2, 3-4, or Full elliptic; Transverse).	Make of springs.	Leaves in front and rear springs.	Length and width of of front and rear springs.	Driver's position (Left, Right).	Make of steering gear.	Turning-circle diameter (feet and inches).	Wheels (Iron, Steel, Wood) and make.	Wheel-base (standard).	Front and rear tire sizes (dual, pneumatic).	Weight of chassis (pounds).	Perc. of weight on rear axle when empty & when loaded.	Line no.
143	C, Own	N	B	2, R	11¾, 10½	E, E	P	½, ½		10,11	40½x2½-43½x2½	L	Gemmer	48, 0	W	144	36x3½-36x6	4,590	50, 90	143
144	W, Own	N	B	2, R	11¾, 10½	E, E	P	½, ½		10 12	40½x2½-47½x2½	L	Gemmer	48, 0	W	144	36x3½-36x6	4,685	50, 90	144
145	W, Sheldon, W-1500	Y	W	2, R	12⅝, 11	E, E	P, Smith	½, ½	Mather	10,11	38x2½-50x2½	L	Jacox	50, 0	W, Prudden	152	36x3½-36x5	4,000	51½, 69	145
146	W, Sheldon, W-103	Y	W	2, R	9½, 10½	E, E	R, Own	½, ½	Betts	8, 11	44x2½-52x3	R	Ross		W, Waterh'se	143	36x3½-36x6	4,900	50, 75	146
147	W, Timken, 6460	N	B	2, R	12½, 10½	E, E	R, Own	½, ½	Tuthill	7, 9	40x2½-50x3	L	Lavine	30, 2	W, St. M'ry	134	36x3½-36x5	4,000		147
148	W, Sheldon, W-1500	Y	B	2, R	10½, 9¼	E, E	P, Savage	½, ½	Merrill	7, 9	38x2½-52x2½	L	Ross		W, Hoopes	130	34x3½-34x5	3,600	36, 88	148
149	W, Timken, 6460	N	B	2, R	10½, 10½	E, E	P, Parish	½, ½	Merrill	7, 12	42x2½-54x2½	L	Ross		S, Dayton	150	36x4-36x5	4,300	—, 70	149
150	C, Own	N	B	2, R	13½, 13½	C, E	P, Own	½, ½	Merrill	8, 9	40x2½-48x3	L	Own	50, 0	W, Schwars	Opt.	36x4-36x3½d	4,800	46, 67	150
151	W, Timken	Y	W	2, R	13½, 9½	E, E	P, Own	½, ½	Merrill	8, 9	40x2½-48x3	L	Own	50, 0	W, Schwars	Opt.	36x4-36x3½d	4,900	47, 69	151
152	W, Sheldon, W-103	Y	B	2, R	9, 9½	E, E	R	½, ½	Sheldon		42x2½-50x3	L	Ross		W, Hayes	144	34x4-36x6	4,600	50, 70	152
154	W, Timken, 6460	Y	B	2, R	9½, 9½	E, E	P, Parish & B	½, ½	Detroit	8, 10	44x2-52x2½	L	Ross	42, 0	W, Prudden	142	34x3½-34x5	3,800	55, 78	154
155	W, Own	Y	B	2, R	13, 11	E, E	P	½, ½	Detroit	7, 11	38x2½-52x2½	L	Own	52, 2	W, Kelsey	124	32x3-32x4	2,350	20, 66	155
156	W, Timken, 6552	N	B	2, R		E, E	R, Own	½, ½	Tuthill	10, 11	43x2½-52x3	L	Ross		W, Standard	144	36x3½-36x5	4,000		156
157	W, Timken, 6456	N	W	2, R	10½, 8½	E, E	P	½, ½	U. S	6, 10	38x2½-48x3	L	Ross	50, 0	I, Smith	126	36x3½-36x5	4,150	50, 65	157
158	W, Chicago, C	Y	B	2, R	10½, 10	E, E	P, Parish & B	½, ½	Cleveland	8, 9	36x2-50x3	L	C.A.S		W, E & O	144	34x3½-34x5	3,200	50, 75	158
159	I, Clark, 1D	N	B	2, R	14, 13	C, C	R, Own	½, ½	Mather	9, 12	35x2-46x2½	L	Lavine	48, 0	W, Royer	133	35x5p-36x5p	3,400	50, 65	159
160	W, Timken, 6460	Y	W	2, R	10½, 9½	E, E	P	½, ½	Coghlin	7, 10	40x2½-52x3	L	Ross	48, 0	W, Hayes	140	34x4-34x5			160
161	W, Timken, 6552	Y		2, R		E, E	R, Own	½, ½	Tuthill				Lavine		W, Prudden		36x3½-36x6			161
162	W, Sheldon, W-103			2, R		E, E	P, Parish & B	½, ½	Tuthill				Lavine		W, Bimel	144	36x3½-36x5			162
163	W, Chicago, C			2, R		E, E	P, Own	½, ½	Standard				Lavine		W, E & O	130	34x3½-34x5			163
164	W, Wisconsin			2, R		E, E	P, Savage	½, ½	Tuthill				Ross		W, Bimel	146	36x3½-36x5			164
165	B, Salisbury			2, R		C, E	R, Detroit		Tuthill				Lavine		W, Bimel	112	33x4-33x4			165
166	W, Sheldon, W21	Y	W	2, R	11, 9½	E, E	P	½, ½	Sheldon	9, 13	39x2½-54x3	R	Ross		W, Prudden	138	34x4-36x6	4,150	—, 90	166
167	W, Own	N	S	2, R	9¾, 9½	C, E	R, Own	½, ½		10, 11	41x2½-46x2½	L	Own	50, 0	W	144	34x3½-34x3½d	4,670	46, 67	167
168	W, Timken	N	B	2, R		E, E	P	½, ½	Perfection	8, 10	42x2½-52x3	L	Ross		W, Schwars	140	34x3½-34x5	4,200	60, 40	168
169	W, Empire, N	Y	B	2, R	11, 11½	E, E	P, Detroit	½, ½	Cooper	8, 13	40x2½-52x2½	L	Ross	46, 6	W, Bimel	140	34x3½-34x5	3,900	45, 75	169
170	W, Sheldon, W-1500	Y	B	2, R	9½, 10	E, E	P, Parish	½, ½	Perfection	8, 14	38x2-50x2½	L	Lavine		W, Schwars	133	34x3-34x4	3,000	75, 75	170
171	E, Own	Y	B	2, R	10, 11½	E, E	P, Savage	½, ½	Sheldon	8, 11	36x2½-56x2½	L	Ross		W, Bimel	150	36x3½-36x5	4,500	35, 85	171
172	I, Torbensen, B	Y	W, Powrlok	2, R		E, E	P, Detroit	½, ½	Mather	8, 15	39x2½-52½x2½	L	Jacox		W	144	34x3½-34x5	3,300		172
173	W, Own	Y	B	2, R	13½, 10½	E, E	R, Standard	½, ½	Own		40x2½-54x2½	L	Own		I, Smith	140	36x3½-36x6			173
173a	W, Sheldon			2, R		E, E		½, ½	Sheldon				Ross		W, Hoopes	133	36x6p-36x6p	3,800	—, 62	173a
174	W, Timken			2, R		E, E	R, Own		Merrill				Ross		W	128½	34x4-34x5			174
175	W, Sheldon, W1500	Y	W	2, R	9½, 9	E, E	P, Savage	½, ½	Garden City	7, 12	36x2½-52x2½	L	Ross	54, 0	W, Standard	135	34x3½-34x5	3,900	20, 70	175
176	I, Torbensen, B	Y	B	2, R	10, 11½	C, E	P, Parish	½, ½	Rowland	7, 13	38½x2½-54x3	L	Ross		W, Schwars	140	34x3½-34x5	3,600		176
177	W, Timken, 6460	Y	B	2, R	—, 9½	E, E	P, Parish & B	½, ½	Perfection	10, 10	40x2½-50x2½	R	Lavine	48, 0	W	137½	34x3½-34x5	3,560	56, 75	177
178	W, Timken, 6460	Y	B	2, R	11½, 9½	E, E	P, Own	½, ½	Mather	9, 11	42x2½-54x3	L	Ross	46, 0	W, Bimel	150	36x3½-36x6	4,850	—, 65	178
179	W, Timken, 6460	Y	B	2, R	11¾, 10½	E, E	P, Own	½, ½	Mather	9, 11	42x2½-54x3	L	Ross	46, 0	W, Bimel	150	35x5p-38x7p	4,900	—, 65	179
180	W, Sheldon, W103	N	B	2, R	11, 11	E, E	P, Savage	½, ½	Detroit	10, 11	44x2½-56x3	L	Ross	53, 0	W, Hayes	144	34x4-36x6	4,760	—, 73	180
181	W, Sheldon	Y	W	2, R			P, Parish & B	½, ½	Mather		38x2½-54x2½	L	Ross		W, Royer	143	34x3½-34x5d			181
182	W, Timken, 6460	N	W	2, R	10½, 10½	E, E	P	½, ½	Mather	8, 10	48x3-54x3	L	Ross	57, 2	W, Prudden	142	36x3½-36x5	4,720	47, 91	182
183	I, Clark, 1D	Y	B	2, R	10, 10	C, C	P, Hydraulic	½, ½	Detroit	8, 11	41x2½-54x3	L	Gemmer	49, 0	W, Wayne	140	34x3½-34x5	3,440	56, 70	183
184	W, Sheldon			2, R		E, E	P, Smith	½, ½	Sheldon						W, Bimel	140	36x3½-36x5	3,800		184
185	W, Timken, 6560	Y	B	2, R	10½, 10	E, E	R, Own	½, ½	Merrill	9, 9	38x2-52x3	L	Ross	45, 0	W, Wayne	129	36x3-36x5	3,500	54, 68	185
186	W, Chicago			2, R		E, E	P, Parish & B	½, ½	Maremont				C.A.S		W	144	34x4p-34x5			186
187	W, Sheldon, W102	N	R	2, R	10, 12	E, E	P	½, ½	Kalamazoo	9, 11	40x2-48x2½	L	Ross	47.0	I, Smith	135	36x3½-36x5	3,650	40, 60	187
188	W, Timken	N	B	2, R	11, 11	E, E	P	½, ½	Detroit		42x2½-52x2½	L	Ross		W	142	35x5p-38x7p	3,800	—, 75	188
189	I, Clark, 1D	Y	B	2, R	11¾, 12½	C, E	P, Detroit	½, ½	Detroit	7, 10	40x2½-54x3	L	Jacox		W	140	35x5p-38x7p	3,450	50, 70	189
190	W, Sheldon, W103	Y	W	2, R		E, E	P, Savage	½, ½			38x2½-50x2½	L	Ross		W, Schwars	138	36x4-36x6	4,700		190
191	I, Clark, 1D	Y	W, Powrlok	2, R	9½, 10	C, C	R, Mason	½, ½	Detroit	9, 11	42½x2½-54x2½	L	Gemmer	47, 6	W, Royer	144	34x3½-34x6	3,750	60, 80	191
192	W, Sheldon, W103	Y	B	2, R	9½, 10½	E, E	P	½, ½	Sheldon	9, 13	39x2½-52x2½	L	Ross	47, 0	W	140	36x3-36x5	4,500	50, 70	192
193	I, Clark			2, R			P	½, ½				L			W	145	34x3½-34x5			193
194	W, Own			2, R		E, E	P	½, ½	Kalamazoo				Lavine		W	133	34x3½-34x5			194
195	I, Clark			2, R		C, E	P		Sheldon			L	Lavine		W, Schwars	144	36x3½-36x5			195
196	I, Torbensen, C	Y	W	2, R	10½, 12	C, E	P, Dunbar	½, ½	Mather	8, 11	40x2½-54x3	L	Ross	46, 0	W, Bimel	133	36x3½-36x5	3,650	52½, 85	196
197	I, Clark	Y	B, W	2, R	12, 12	C, E	R, Own	½, ½	Tuthill	7, 10	36x2½-48x3	L			W, Prudden	140	-x4—x5	3,250	80, 80	197
198	W, Empire, N	Y	B	2, R	10, 10½	E, E	P, Parish	½, ½	Sheldon		40x2½-52x3	L	Lavine		W, Crane	144	36x3½-36x5			198
199	W, Timken, 6460	Y	W	2, R	10, 10	E, E	P, Parish & B	½, ½	Sheldon	8, 10	41½x2½-50x3	L	Ross	51, 0	W, Bimel	144	36x3½-36x5	3,750	54, 76	199
200	W, Sheldon	Y	W	2, R	9½, 10½	E, E	P, Own	½, ½	Detroit			R	Ross		W	144	36x3½-36x5	4,100		200
201	W, Wisc., 800E	Y	B	2, R		E, E	P	½, ½	Sheldon	9, 10	40x2½-52x3	L	Own		I, Smith	144	36x4-36x5	4,600	25, 75	201
202	W, Timken, 6460	Y	B	2, R	10½, 10½	E, E	R	½, ½	Perfection	8, 12	38x2½-52x2½	L	Ross		W	140	36x3½-36x5	3,800		202
203	I, Clark, 1D	Y	B	2, R	10, 11½	C, C	R, Own	½, ½	Harvey	9, 12	40x2½-48x2½	R	Lavine	56, 0	I, Own	140	34x3½-34x5	3,600	40, 75	203
204	I, Clark, 1D	Y	B	4, FR	11½, 10½	C, C	R	½, ½	Harvey	9, 12	40x2½-48x2½	L	Lavine	58, 0	I, Own	132	32x4-32x4	4,100	30, 60	204
205	W, Sheldon			2, R		E, E	P, Smith						Lavine		W	136	34x3½-34x4			205
206	W, Timken			2, R		E, E	P, Parish	½, ½	Delaney			L	Ross		W, Arch'ld	120	36x3½-36x5			206
207	I, Russel			2, R		C, E	P, Parish & B	½, ½	Tuthill			L	Gemmer		W	140	34x3½-34x5			207
208	I, Russel, P1-300	N	B	2, R	15, 14	E, C	P					L	Ross		W	150	36x3½-36x5	4,000	40, 70	208
209	W, Own			2, R		E, E	P, Own	½, ½	Mather				Ross		W	136	36x3½-36x5			209
210	W, Timken, 6560	Y	B	2, R	11¾, 9½	E, E	P	½, ½	Detroit	8, 12	40x2½-52x3	L	Ross	54, 0	W, Bimel	148	36x4-36x7	4,450	52, 80	210
211	W, Wisc., 800J	Y	B	2, R	12½, 10½	E, E	P, Parish & B	½, ½	Sheldon	9, 11	41x2½-52x3	L	Ross	61, 2	I, Smith	150	36x4-36x7	4,800	53, —	211
212	S, Own	Y	B	2, R		C, E	P	½, ½	T			R	Own		W	97		3,600		212
214	I, Clark, 2	N	S	2, R	14, 13	C, E	P, Parish & B	½, ½	Higgins	8,13	40x2½-52x3	L	Lavine	48, 0	W, Bimel	144	36x7-40x8	3,800	30, 75	214
215	I, Clark, 2	N	B	2, R	11, 11	C, E	R, Savage	½, ½	Mather	9, 12	40x2½-52½x3	L	Lavine	52, 0	S, Clark	154	36x4-36x7	4,000	50, 80	215
216	W, Timken, 6560	N	W	2, R	11½, 9½	E, E	R, Own	½, ½	Philadelphia	12, 14	44x2½-50x3	L	Ross	40, 0	W, Schwars	150	36x4-36x6	4,500	45, 70	216
217	W			2, R		E, E	R						Ross			152	36x4-36x7			217

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4,000 (Conestoga—Winther) INTERNAL-COMBUSTION

Line no.	Brand name and model name or number	Price f. o. b. factory with seat and tires but without body.	Make of engine and model number.	Number of cylinders.	Bore and stroke, and N. A. C. C. horse-power.	Lubrication (Forced-feed, Splash).	Make of governor (None).	Water-circulation (Pump, Thermo-siphon).	Radiator (Cellular, Tubular) and make.	Radiator guard included in price? (Yes or No)	Make of carbureter.	Fuels (Distillate, Gasolene, Kerosene).	Ignition (Battery, Magneto) and make of magneto.	Electric starting and lighting included in price? (Yes or No)	Clutch (Cone, Multiple-disk, Plate) and make.	Transmission (Individual-clutch, Planetary, Sliding-gear) and number of forward speeds.	Make of transmission and model number.	Power take-off included in price? (Yes or No)	Make of universal joints.	Line no.
	4,000 Pounds—Con.																			
218	Conestoga, 30	2,700	Continental, N	4	3¾x5-22.5	FS	Duplex	T	T, E & M	N	Stromberg	G	M, Simms	N	M, Fuller	S, 3	Fuller, TU3	N	Sterling	218
219	Day-Elder, D	2,450	Continental	4	4¼x5½-27.2		Monarch	P	T, Bush		Zenith		M, Berling		M, Fuller	S, 3	Covert		Hartford	219
220	Dearborn, BW	2,390	Buda	4	3¾x5-22.5	F	Simplex	T	T, Chicago	Y	Stromberg	G	M, Bosch	N	M, Fuller	S, 3	Fuller	N	Hartford	220
221	Defiance, E		Continental	4	3¾x5-22.5		N	P	C, Perfex		Stromberg			Y	P, Borg & B	S, 3	Grant-Lees			221
222	DeKalb, E2	2,250	Continental	4	4¼x5½-27.2		N	P	T, Jackson		Master		M, Eisemann		M, Fuller	S, 3	Fuller		Hartford	222
223	Denby, 134	2,450	Continental, N	4	3¾x5-22.5	F	Monarch	T	T, Long	Y	Stromberg	G	M, Eisemann	N	M, Fuller	S, 4	Fuller, GU	N	Universal	223
224	Diamond T, U	3,485		4	4x5½-25.6	F		P	T, G & O	N	Stromberg	G	M, Bosch	N	M	S, 4		N	Spicer	224
225	Dorris, K4	3,400	Own	4	4¼x5½-28.9	F	Own	P	T, McCord	Y	Stromberg	G	M, Bosch	N	M, Warner	S, 4	Warner, T53	N	Spicer	225
225a	Douglas, H (int.)	2,650	Buda	4	4¼x5½-27.2	F	Pierce	P	Own		Schebler		M, Eisemann		M, Fuller	S, 3	Fuller		Arvac	225a
225b	Douglas, H (worm)	2,850	Buda	4	4¼x5½-27.2	F	Pierce	P	Own		Schebler		M, Eisemann		M, Fuller	S, 3	Fuller		Arvac	225b
226	Erie			4	4¼x5½-27.2		Pierce		T		Stromberg		M, Bosch		M	S, 4				226
227	Fargo, P	2,250	Continental, N	4	3¾x5-22.5	FS	Monarch	T	T, Own	N	Rayfield	G	M, Bosch	N	M, Fuller	S, 4	Fuller, GU	N	Spicer	227
228	Federal, UE	2,900	Continental, C4	4	4¼x5½-27.2	FS	Pharo	P	T, McCord	Y	Zenith	G	M, Eisemann	N	P, Borg & B	S, 4	Detroit, TUE	N	Spicer	228
229	Forschler, B	2,750	Continental	4	4¼x5½-27.2		Duplex	P	T, Own		Zenith		M, Bosch		M, Fuller	S, 3	Fuller		Own	229
230	Fulton, C	2,350	Herschell-Spill	4	3¾x5-16.9		Pierce	T	T, G & O		Carter		M, Simms	N	P, Borg & B	S, 3	Durston		Universal	230
231	Gabriel, E	3,250	Buda	4	4¼x5½-28.9		Duplex	P	C, G & O		Rayfield		M, Bosch	N	P, Borg & B	S, 4	Brown-Lipe		Spicer	231
232	Garford, 70H	3,190		4	4¼x5½-28.9	F	Simplex	P	T, Own	N	Rayfield	G	M, Splitdorf	N	M	S, 4		N		232
233	Giant, 16	3,050	Continental, C4	4	4¼x5½-27.2	FS	Pierce	P	C, Own	Y	Schebler	G,K	M, Eisemann	N	M, Brown-L	S, 3	Brown-L, 35	N	Spicer	233
234	GMC, 41A	3,100	Continental, C2	4	4¼x5½-27.2	FS	Monarch	P	T, Own	N	Marvel	G	M, Eisemann	N	M, Own	S, 4	Own	N	Own	234
235	Gramm-Bernstein, 20	3,275	Continental, C2	4	4¼x5½-27.2	FS	Pierce	P	T, Own	Y	Stromberg	G	B, North East	N	M, Fuller	I, 4	Own	N	Own	235
237	Hall	2,875	Continental, C4	4	4¼x5½-27.2	FS	Simplex	P	T, Long	Y	Zenith	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 35	N	Spicer	237
238	Hendrickson	3,000	Buda, BU4R	4	4¼x5½-28.9	S		P	T, Chicago		Stromberg		M, Dixie		M, Fuller	S, 4	Fuller			238
239	Independent (Iowa), F	2,290	Continental	4	4¼x5½-27.2		N	P	C, Chicago				M, Bosch	N	M, Fuller	S, 3	Fuller		Blood	239
240	Independent (Ohio), G	2,300	Continental	4	4¼x5½-27.2		Monarch	P	T, Long		Zenith		M, Eisemann		M, Fuller	S, 3	Fuller		Sterling	240
240a	Indiana, 20	3,140	Own	4	4¼x5½-27.2	F	Pierce	P	T, Long	Y	Stromberg	G	M, Eisemann	N	P, Borg & B	S, 4	Brown-L, 35	N	Acme	240a
241	International, G	2,700	Own	4	4x5-25.6	FS	Own	T	T, Long, McC	Y	Ensign	G	M, Dixie	N	M, Own	S, 3	Own	Y	Own	241
242	Jumbo, 20		Buda, CTU	4	3¾x5½-22.5	F	N	P	T, Own	Y	Zenith	G	B, Northeast	Y	M, Fuller	S, 3	Fuller, LTUS	Y	Arvac	242
243	Keldon, 19	2,885	Buda	4	4¼x5½-28.9		Waukesha	P	C, Eureka		Stromberg		M, Eisemann		P, Borg & B	S, 3	Covert		Acme	243
243a	Keystone, 40	1,795	Own	4	4x4¼-25.6		Pierce	T	T, McCord		Zenith		M, Berling	N	M, Fuller	S, 3	Fuller		Spicer	243a
244	Kimball, B	3,675	Wisconsin, TU	4	4x6-25.6	FS	Du ex	P	C, Flexo	N	Zenith	D	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 35	N	Spicer	244
246	Kleiber, BB	3,200	Continental, C4	4	4¼x5½-27.2	S	Pierce	P	C, Perfex	N	Stromberg	G	M, Bosch	N	M, Hele-Shaw	S, 4	Brown-L, 50-4	N	Spicer	246
247	Lange, B	2,950	Continental	4	4¼x5½-27.2		Pierce	P	T, Own		Stromberg		M, Bosch	N	M, Hele-Shaw	I, 3	Own		M & E	247
247a	Luedinghaus, K	2,700	Waukesha, RU4R	4	4¼x5½-28.9		Waukesha	P	T, Own	N	Schebler	G	M, Splitdorf	N	P, Borg & B	S, 3	Detroit		Spicer	247a
248	Mack, AB (chain)	3,300	Own	4	4x5-25.6	S	Own	P	C, Own	N	Zenith	G	M, Aero	N	M, Brown-L	S, 4	Brown-L	N	Spicer	248
249	Mack, AB (worm)	3,300	Own	4	4x5-25.6	S	Own	P	C, Own	N	Zenith	G	M, Aero	N	M, Brown-L	S, 4	Brown-L	N	Spicer	249
250	Menominee, D		Continental, C4	4	4¼x5½-27.2	S	Monarch	P	T, Own	N	Stromberg	G	M, Eisemann	N	M, Fuller	S, 4	Fuller, GU	N	Spicer	250
251	Midland, MT	3,000	Buda, HU	4	4¼x5½-28.9	F	Duplex	P	T, Chicago		Stromberg		M, Eisemann		M, Fuller	S,	Fuller, JU2			251
252	Muskegon, 20	2,325	Continental	4	4¼x5½-27.2		Pierce	P	C, Mayo		Detroit		M, Eisemann	N	M, Fuller	S, 3	Fuller		Arvac	252
253	Mutual, 2A	3,375	Wisconsin, TAU	4	4x6-25.6	F	Duplex	P	C, Perfex	N	Stromberg	G	M, Bosch	Y	M, Hele-Shaw	S, 4	Fuller, G5	N	Spicer	253
254	Nash, 3018	2,395	Own	4	3¾x5½-22.5	FS	Simplex	P	T, Long	N	Stromberg	G	M, Eisemann	Y	P, Borg & B	S, 4	Detroit, H36	N	Own	254
255	Nash, 4017 Quad	3,250	Buda, HU	4	4¼x5½-28.9	F	Simplex	P	T, Long	N	Stromberg	G	M, Eisemann	N	P, Borg & B	I, 4	Own	N	Own	255
256	National, HA		Waukesha, RU4K	4	4¼x5½-28.9	S	Waukesha	P	C, McKinnon	Y	Zenith	G	M, Eisemann	N	M, Hele-Shaw	S, 4	Brown-L, 35	N	Spicer	256
257	Netco, D	3,100	Continental, C4	4	4¼x5½-27.2	S	N	P	T, R'me-T'r'y	N	Zenith	G	M, Eisemann	N	M, Brown-L	S, 3	Brown-L, 50	N	Hartford	257
258	Niles, (Pa.), E	2,800	Continental, C4	4	4¼x5½-27.2	FS	Pierce	P	C, Modine	Y	Stromberg	G	M, Eisemann	N	P, Borg & B	S, 3	Covert, O		Blood	258
259	Noble, C40		Buda	4	4x5½-25.6		Pierce	P	T, Chicago		Stromberg		M, Eisemann		M, Fuller	S, 3	Fuller		M & E	259
260	Northway, B2	3,250	Own	4	4x6-25.6	FS	Pierce	P	C, G & O	Y	Schebler	G	B	Y	M, Fuller	S, 4	Fuller, GU5	N	Spicer	260
262	Olympic, A	3,300	Continental, C4	4	4¼x5½-27.2	FS	Monarch	P	T, Long		Stromberg	G	M, Bosch		M, Brown-L	S, 4	Brown-L, 50	N	Thermoid	262
263	Oshkosh, A	3,500	Hers'l-Spill, 7000	4	3¾x5-19.6	FS	Duplex	P	C, Own	N	Zenith	G	B	Y	M, Brown-L	S, 4	Brown-L, 35	Y	Peters	263
264	Packard, 2E	3,600	Own	4	4x5½-25.6	F	Own	P	T, Fedders	N	Own	G	M, Dixie	N	M, Own	S, 4	Own	N	Thermoid	264
265	Palmer	2,277	Continental, C4	4	4¼x5½-27.2	FS	Pierce	P	C, Fedders		Stromberg		M, Bosch		M, Fuller	S, 3	Fuller			265
267	Parker, F20	3,500	Wisconsin, TAU	4	4x6-25.6	F	Monarch	P	T, Bremer	Y	Stromberg	G	M, Bosch	Y	M, Brown-L	S, 4	Fuller, G	N	Blood	267
268	Pierce-Arrow, X4	4,300	Own	4	4x5½-25.6	F	Own	P	T, Own	N	Own	G	B, M, Berling	N	C, Own	S, 4	Own	N	Own	268
269	Pioneer, F	2,790	Continental	4	4¼x5½-27.2		Pierce	P	T, McCord		Stromberg		M, Eisemann	N	M, Brown-L	S, 4	Brown-L		Spicer	269
270	Power, B	2,950	Continental	4	4¼x5½-27.2		Pierce	P	C, Candler		Stromberg		M, Simms	N	M, Fuller	S, 4	Fuller		Universal	270
271	Rainier, R8	2,650	Continental, N	4	3¾x5-22.5	FS	Monarch	T	C, Harrison	N	Zenith	G	M, Simms	N	M, Brown-L	S, 3	Brown-L, 30	Y	Hartford	271
272	Rowe, CDW	3,300	Wisconsin	4	4x5-25.6	F	Simplex	P	C, Fedders		Zenith		M, Bosch	N	M, Brown-L	S, 4	Brown-Lipe		Spicer	272
273	Royal	3,200	Wisconsin	4	4x6-25.6		Monarch	P	T, Kells		Stromberg		M, Bosch		P, Borg & B	I, 3	Own	N		273
274	Sandow, I	2,375	Continental, N	4	3¾x5-22.5	S	N	P	T, Chicago	Y	Stromberg	G	M, Eisemann	N	M, Brown-L	S, 3	Fuller, TU¾		Spicer	274
275	Schacht		Buda, HU	4	4¼x5½-28.9	F	Duplex	P	T, Own	N	Schebler	G	M, Bosch	N	C, Own	S, 4	Own	N	M & E	275
276	Shaw, M3	2,700	Continental, C4	4	4¼x5½-27.2	FS	Pierce	P	T, Long		Zenith		M, Bosch		M, Brown-L	S, 3	Brown-Lipe			276
277	Southern, 20		Buda, ITU	4	4x5½-25.6	FS	Pierce	T	T, Standard	N	Zenith		M, Bosch	N'	P, Borg & B	S, 3	Fuller	N	Spicer	277
279	Sterling	3,100	Own	4	4x5½-25.6	F	Waukesha	P	C, Own	Y	Rayfield	G	M, Eisemann	N'	M, Brown-L	S, 4	Brown-L, 35	N	Spicer	279
280	Stewart, 7	2,875	Continental, C4	4	4¼x5½-27.2	FS	Pierce	P	T, Bush	N	Zenith	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU3	N	Hartford	280
281	Stoughton, D			4	4x5½-25.6	F		P	T, Chicago	Y	Stromberg	G	M, Eisemann		M, Brown-L	S, 3	Brown-Lipe		Thermoid	281
282	Sullivan, E	3,350	Buda, HTU	4	4¼x5½-28.9	S	N	P	T, Bush	N	Stromberg	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 35	N	Spicer	282
283	Superior, E	2,450	Continental, C2	4	4¼x5½-27.2	F	Pierce	P	C, Ideal	Y	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU3	Y	Arvac	283
284	Traffic, 746	1,497	Continental, N	4	3¾x5-22.5	FS	N	P	C, Own	N	Carter	G	M, Bosch	N	M, Covert	S, 3	Covert, MU-T	N	Universal	284
285	Transport, 50	2,785	Continental, C2	4	4¼x5½-27.2	FS	Duplex	P	C, Spirex	Y	Stromberg	G	M, Eisemann	N	M, Fuller	S, 4	Fuller, GU	N	Hartford	285
286	Triangle, C	2,585	Waukesha, BU4	4	3¾x5½-22.5	S	Waukesha	P	T, Perfex	N	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, TU3	N	Detroit	286
287	Triumph, H	2,350	Buda, CTU	4	3¾x5½-22.5	F	Pierce	P	C, Modine	Y	Bennett	G	M, Dixie	N	P, Borg & B	I, 3	Cotta, AAU	N	Hartford	287
288	Universal, D		Own	4	4¼x5½-28.9		Monarch	P	T, Long		Zenith		M, Eisemann		M, Own	S, 3	Own			288
289	Victor (Mich.), B		Continental, N	4	3¾x5-22.5	F	N	P	C, Modine		Stromberg		M, Eisemann		M, Fuller	S, 3	Fuller, LTU	Y	Acme	289
290	Vim, 22	3,150	Hercules	4	3¾x5½-22.5	F	Duplex	P	T, McCord	N	Zenith	G	M, Dixie	N	M, Brown-L	S, 4	Brown-L, 35	N	Spicer	290
291	White, 20	3,300	Own	4	3¾x5½-22.5	FS	N	P	C	N	Own	G	M		P, Own	S, 4	Own	N	Own	291
292	Wichita, M	2,800	Waukesha, BX	4	3¾x5½-22.5	F	Waukesha	P	C, Perfex	Y	Stromberg	G	M	N	C	I, 3	Cotta	N	Ther moid	292
293	Winther, 49	3,250	Wisconsin, EAU	4	4x5-25.6	F	N	P	T, Bremer	N	Master	G	M, Eisemann	N	P, Borg & B	S, 4	Brown-L, 50	N	Blood	293

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TRUCK SPECIFICATIONS

4,000 (Conestoga—Winther)

Line no.	Final drive (Bevel, Cha n. Internal-gear, Spur-and-bevel, Worm) and make of rear axle and model number.	Hotchkiss drive? (Yes or No)	Differential (Bevel, Spur, Worm) and make.	Number and location of driving-wheels (Front, Rear).	Clearance under front and rear axles.	Service and emergency brakes (Contracting, Expanding).	Frame material (Pressed-steel, Rolled-steel) and make.	Front and rear springs (Cantaliver; 1-2, 3-4, or Full elliptic; Transverse).	Make of springs.	Leaves in front and rear springs.	Length and width of of front and rear springs.	Driver's position (Left, Right).	Make of steering gear.	Turning-circle diameter (feet and inches).	Wheels (Iron, Steel, Wood) and make.	Wheel-base (standard).	Front and rear tire sizes (dual, pneumatic).	Weight of chassis (pounds).	Perc. of weight on rear axle when empty & when loaded.	Line no.
218	W, Wisc., 800C	Y	W	2, R	11, 10	E, E	R, Own	½, ½	Iron City	9, 12	40x2½-52x3	L	Ross	50, 0	W, E & O	138	36x4-36x4d	4,200	50, 70	218
219	W, Wisconsin			2, R		E, E	P, Savage		Iron City			L	Ross		W, Jones	144	36x4-36x6			219
220	W, Chicago, C4	Y	B	2, R	10½, 12	E, E	R, Own	½, ½	Maremont	7, 11	41½x2½-48x3	L	Ditweiler	49, 4	W, Crane	148	34x4½p-34x7	3,500	50, 80	220
221	I, Torbensen			2, R		E, E	P, Detroit		Detroit			L	Own		W, Crane	140	35x5p-38x7			221
222	W, Timken			2, R		E, E	P, Parish					L	Ross		W, Schwars.	134	34x3½-36x5			222
223	J. Russel, 3-201	Y	B	2, R	10, 13	C, E	P	½, ½	Detroit	8 .13	44x2½-52x3	L	Gemmer	57, 1	W, Hayes	144	36x3½-36x6	3,800	50, 75½	223
224	W, Timken	Y	W	2, R		E, E	P	½, ½	Mather	9, 12	40x2½-53x2½	L	Gemmer		W, Prudden	160	36x4-36x7	4,800	50, 90	224
225	W, Timken, 6552	Y	W	2, R	11½, 9½	E, E	P, Smith	½, ½	Rowland	9, 15	42x2½-56x3	L	Ross	60, 0	I, Smith	144	36x4-36x7	5,050	86, 70	225
225a	I. Torbensen			2, R					Own				Ross			128	36x4-36x7	3,900		225a
225b	W, Wisconsin			2, R					Own				Ross			128	36x4-36x7	3,900		225b
226	W, Timken			2, R			P				40x2½-54x3		Ross	50, 9		144	34x3½-36x5			226
227	I, Russel, U	Y	B	2, R	10, 12	E, C	R, Own	½, ½	Sheldon			L	Jacox		W	140	36x4-36x6	4,200	85, 80	227
228	W, Timken, 6560	N	B	2, R	12½, 9	E, E	P	½, ½	Mather	9, 13		L	Gemmer		W, Auto	156	36x4-36x7	4,800	60, 71	228
229	W, Sheldon			2, R		E, E	R, Own					L	Ross		I, Smith	144	36x4-36x7			229
230	I, Russel			2, R		C, C	P, Parish & B	½, ½	Rowland			L	Lavine	48, 0	W, E & O	137	34x4-34x6			230
231	W, Timken			2, R		E, E	P, Parish		Merrill			L	Gemmer		W, Standard	156	36x4-36x7			231
232	W	Y	B	2, R		E, E	P	½, ½		9, 11	42x2½-50x2½	L	Ross	57, 0	W	144	36x4-36x7	4,590		232
233	W, Sheldon, W103	Y	B	2, R	12½, 10½	E, E	P, Hydraulic	½, ½	Mather	8, 10	40x2½-56x3	R	Ross		W, Wayne	168	36x4-36x7	4,500	55, 75	233
234	W, Timken, 6560	N	B	2, R	12½, 9½	E, E	P Smith	½, ½	Detroit	8, 10	40x2½-54x3	L	Jacox		Own	144	36x4-36x7	4,855	53, 74	234
235	W, Standard	Y	B	2, R	11, 10½	E, E	P, Own	½, ½	Perfection	11, 12	40½x2½-52x2½	L	Ross	51, 0	W, Bimel	144	36x4-36x7	4,700	72, 91	235
237	W, Timken, 6552	Y	W	2, R	12, 9	E, E	R	½, ½	Perfection	9, 12	40x2½-54x3	L	Gemmer		I, Smith	156	36x4-36x4	4,825	25, 80	237
238	W, Timken			2, R					Tuthill				Ross		W	140	36x4-37x7			238
239	I, Russel			2, R		C, E	R, Own		Garden City			L	Lavine		W, Prudden	146	34x4-34x6			239
240	W, Wisconsin			2, R		E, E	P, Parish & B		Iron City			L	Wohlrab		S.Indestruct	144	34x4-34x6			240
240a	W, Sheldon, W-103	N	B	2, R	12½, 10½	E, E	R	F, ½	Sheldon	9, 11	40x2½-50x3	L	Wohlrab	48, 0	W, Bimel	150	36x4-36x7	5,360	58, 68½	240a
241	I, Own		B	2, R	10½, 12	E, E	P	½, ½		10, 14	39½x2½-55½x3	L	Own		W	138	36x4-36x6	4,060	50, 68	241
242	I, Clark, 1D	Y	B	2, R	11, 15½	C, E	P	½, ½	Perfection	9, 11	40x2½-52x2½	L	Jacox	35, 0	W	144½	35x5p-38x7p	3,750	50, 75	242
243	I, Russel			2, R		C, E	R, Own	½, ½	Champion			L	Ross		I, Smith	144	36x4-36x7			243
243a	I, Russel			2, R		E, E	R, Own		Rowland			L	Ross		W, Wayne	144	34x4½p-36x5			243a
244	W, Sheldon, W102	Y	B	2, R		E, C	P, Parish	½, ½	U. S	10, 11	40½x2½-47x2½	L	Ross	39, 6	W, Weston		36x6p-36x7		50, 80	244
246	W, Timken, 6560	Y	W	2, R	9½, 10	E, E	R, Own	½, ½	Betts	8, 11	44x2½-52x3	R	Ross		W, Waterb'se	153	36x4-37x7	5,300	50, 75	246
247	C, Own			2, R		C, E	R, Own		Standard			L	Gemmer		W, Hoopes	136	36x4-36x6			247
247a	W, Wisconsin, J	N	B	2, R	10½, 10½	E, E	P	½, ½	Tuthill		42x2½-54x3	L	Lavine		W, Bimel	145	36x4-36x7	4,400	—, 80	247a
248	C, Own	N	B	2, R	13½, 13½	C, E	P, Own	½, ½	Merrill	8, 11	40x2½-48x3	L	Own	50, 0	W, Schwars.	Opt.	36x4-36x4d	4,900	47, 70	248
249	W, Timken	Y	W	2, R	13½, 9½	E, E	P, Own	½, ½	Merrill	8, 11	40x2½-48x3	L	Own	50, 0	W, Schwars.	Opt.	36x4-36x4d	5,000	48, 70	249
250	W, Timken, 6552	N	B	2, R		E, E	R, Own	½, ½	Tuthill	10, 11	43x2½-52x3	L	Ross		W, Standard	160	36x4-36x4d	4,700		250
251	W, Timken, 6552			2, R		E, E	R, Own	½, ½					Ross		I, Smith	144	36x4-36x4d			251
252	I, Torbensen			2, R		C, E	P, Parish & B	½, ½	Sheldon			L	Lavine		W, Prudden	144	36x4-36x6			252
253	W, Sheldon, W21	N	B	2, R	11, 9½	E, E	P, Parish & B	½, ½	Mather	8, 10	41x2½-56x3	L	Ross	52, 0	I, Smith	152	36x4-36x8	5,800	40, 71	253
254	I, Clark, 2D	Y	W	2, R	9½, 9½	C, C	P, Own	½, ½	Alloy	10, 12	37½x2½-52x2½	L	Jacox	50, 0	W, Auto	144	34x4-34x6	3,850	51, 73½	254
255	I, Own	Y	W	4, FR	14½, 14½	E, C	P, Own	½, ½	Mather	9, 8	48x2½-48x2½	L	Lavine	50, 0	S	124	36x5-36x5	6,250	33½, 55	255
256	W, Timken, 6560	N	W	2, R	10½, 9	E, E	R	½, ½	Mather	9, 11	40x2½-54x3	L	Ross	26, 0	W, Hayes	141	34x4-34x4d	5,000		256
257	W, Timken, 6560	Y	B	2, R	12, 11	E, E	P	½, ½	Perfection	8, 12	39x2½-49x3	L	Ross		W, Arch'ld	168	36x4-36x6	4,940	57, 65	257
258	W, Timken, 6550	N	W	2, R	11, 9	E, E	P, Savage	½, ½	Iron City	9, 14	45x2½-53x3	L	Gemmer		W, Hoopes	140	36x4-36x7	4,600		258
259	W, Sheldon			2, R		E, E	P, Parish & B	½, ½	Tuthill			L	Lavine		W, Bimel	148	36x4-36x7			259
260	W, Sheldon, W21	Y	B	2, R	14, 9	E, E	P	½, ½	Perfection	9, 10	42x2½-54x3	L	Ross	50, 0	S, Clark	146	36x4-36x4	5,300	58½, 77½	260
262	W, Timken, 6560	N	B	2, R	10, 10	E, E	P, Savage	½, ½	Mather	7, 12	39x2½-50x3	L	Ross		W, St. M'r'y	158	36x4-36x7	4,850		262
263	R, Own	Y	B	4, FR	10½, 10½	C, C	P, Smith	½, ½	Tuthill	10, 11	50x2½-54x2½		Ross	52, 0	W, Bimel	146	36x6p-36x6p	4,500		263
264	W, Own	N	S	2, R	9½, 8½	C, E	R, Own	½, ½		11, 11	41x2½-46x2½	L	Own	56, 0	W	144	34x4-34x4d	5,100	48, 70	264
265	W, Own			2, R		E, E	P, Own	½, ½	Tuthill				Ross		W, Bimel	150	34x4-36x4d			265
267	W, Own	N	B	2, R	9½, 10	C, E	P, Smith	½, ½	Tuthill	8, 12	51x3-60x3	L	Ross	56, 0	W, Bimel	150	34x4-36x4d	5,200	51, 71	267
268	W, Own	N	W	2, R	13, 9½	C, E	P, Own	½, ½	Spring Perch	10, 13	41x2½-54x3	R	Own	42, 0	W, Own	150	36x4-36x4d	6,250	60, 75	268
269	W, Timken			2, R		E, E	P, Parish					L	Ross		S, Budd	144	36x4-36x7			269
270	W, Timken			2, R		E, E	R, Own		Detroit			L	Ross		W, Hayes	150	36x4-36x4d			270
271	W, Sheldon, W103	Y	B	2, R	9½, 10½	E, E	P, Parish	½, ½	Perfection	9, 12	38x2½-50x2½	L	Ross		W, Schwars.	147	34x5-34x6	3,450	75, 75	271
272	W, Sheldon			2, R			R, Own	½, ½	Sheldon			L	Ross		W, Hoopes	140	34x4-36x3d	4,500	—, 62	272
273	W, Timken			2, R		E, E	R, Own		Merrill				Ross			132	36x4½-36x6			273
274	I, Torbensen, C2	Y	B	2, R	13, 13½	C, E	P, Savage	½, ½	Garden City	8, 12	38½x2½-54x3	L	Ross	60, 0	W, Standard	150	36x4-36x6	4,300	20, 70	274
275	W, Own	N	B	2, R	11, 9	C, E	R, Own	½, ½	National	9, 14	35x2½-50x3	L	Own		W, St. M'rys	144	36x4-36x7	5,500	80, 80	275
276	W, Timken			2, R			P, Smith		Perfection				Gemmer		W	153	36x4-36x6			276
277	W, Sheldon	Y	W	2, R			P, Parish & B		Mather		38x2½-54x2½	L	Ross		W, Royer	157	35x3-35x5			277
279	W, Timken, 6560	N	W	2, R	12½, 10	E, E	P, W	½c ½c	Mather	8, 11	48x3-54x3	L	Ross	57, 2	W, Prudden	142	36x4-36x6	5,000	45, 97	279
280	I, Clark, 2D	Y	B	2, R	10, 10	C, C	P, Hydraulic		Detroit	9, 12	41x2½-54x3	L	Ross	50, 0	W, Wayne	156	34x4-34x7	4,460	59, 72	280
281	W, Sheldon	N		2, R		E, E	P, Smith	½, ½	Sheldon		40x2½-50x3	L			W, Bimel	140½	36x4-36x7	4,600		281
282	W, Timken, 6560	Y	B	2, R	10½, 10	E, E	Parish & B	½, ½	Sheldon	9, 11	40x2½-52x3	L	Ross	52, 0	W, Wayne	150	36x4-36x7	4,750	53, 71	282
283	I, Torbensen, CE	Y	B	2, R	13, 13	C, E	P	½, ½	Tuthill	8, 13	38x2½-51x3	L	Ross	46, 0	W, Schwars.	144	36x4½-36x6	3,600	75, —	283
284	I, Russel, PI-302	Y	B	2, R	11, 12	C, E	R, Own	½, ½	Detroit	9, 10	36½x2-46x2½	L	Own	48, 6	W, Bimel	132	34x3½-34x5	3,175	42, 85	284
285	I, Clark, 2D	Y	B	2, R	10½, 11½	C, E	P	½, ½	Detroit	9, 12	40x2½-54x3	L	Jacox		W	150	36x6p-40x8p	4,250	50, 70	285
286	I, Clark, 2D	Y	W, Powrlok	2, R		C, C	R, Mason	½, ½	Detroit	10, 12	42½x2½-54x3	L	Gemmer	56, 0	W, Royer	147	36x4-36x6	4,200	60, 80	286
287	I, Russel, P-300	Y	B	2, R	12, 13½	C, E	R	½, ½	Higgins	9, 11	36x2½-50x2½	L	Lavine	46, 0	W, Standard	144	36x3½-36x5	4,200	40, 70	287
288	C, Own			2, R		E, E	P	½, ½	Kalamazoo				Lavine		W	132	36x5-36x4d			288
289	I, Clark	Y	BW	2, R	12, 12	C, E	R, Own	½, ½	Tuthill	7, 10	36x2½-48x3	L			W, Prudden	140	—x4—x5	3,250	80, 80	389
290	W, Sheldon, W102	Y	W	2, R	12½, 10	E, E	P	½, ½	Sheldon	9, 12	42x2½-56x3	L	Gemmer	37, 10	I, Smith	142	36x4-36x6	4,700	40, 70	290
291	B, Own	N	B	2, R	10½, 9	C, E	P	½, ½				L	Own	60, 0	W	157½	36x4-36x7	4,150	54, 70	291
292	W, Sheldon	Y	W	2, R	9½, 10½	E, E	P, Own	½, ½	Detroit			R	Ross		W	144	36x3½-36x6	4,400		292
293	I, Clark, 2D	Y	B	2, R	12, 11	C, C	R, Own	½, ½	Mather	8, 10	46x2½-56x3	R	Ross	60, 0	I, Own	147	34x4-34x4d	5,300	45, 80	293

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	5,000 Pounds:																			
294	Acason, H	3,850	Waukesha, CU	4	4½x5½-30.6	F	Waukesha	P	C, National	Y	Schebler	G	M, Eisemann	N	M, Detlaff, H6	I, 4	Cotta, R	Y	Blood	294
295	Ace, A	3,500	Buda, HU	4	4½x5½-28.9	FS	Pierce	P	C, Modine	Y	Schebler	G	B, West'gh'se	Y	M, M & E	I, 4	Cotta	N	M & E	295
295a	All-American	2,395	Herschell-Spill'n	4	3½x5 -19.6	FS		T			Stromberg		M, Simms		M	I, 4	Cotta			295a
296	Apex, E	2,450	Buda, HU	4	4½x5½-28.9	F	Simplex	P	C, Candler	Y	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, GU3	N	Detroit	296
297	Armleder, HW		Continental, C4	4	4½x5½-27.2	FS		P	T, Long	N	Zenith	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, U50	N	Spicer	297
298	Atterbury, 7CX	3,375	Continental, C4	4	4½x5½-27.2	FS	Monarch	P	T, Own	N	Zenith	G	M	N	M, Brown-L	S, 4	Brown-L, 35	N	Spicer	298
299	Available, H2½	3,250	Continental, C4	4	4½x5½-27.2	FS	Pierce	P	T, Chicago	Y	Stromberg	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 35	N	Ther.-Sp.	299
300	Beck, D	3,500	Continental	4	4½x5½-32.4	F	Pierce	P	C, Ideal	Y	Stromberg	G	M, Bosch	N	M, Cotta	I, 3	Cotta	Y	Blood	300
301	Bell	2,750	Buda, HU	4	4½x5½-28.9	F	Duplex	P	T, Chicago	Y	Stromberg	G	M, Eisemann	N	P, Borg & B	S, 3	Detroit	Y	Universal	301
302	Bessemer, J2	3,285	Continental, C2	4	4½x5½-27.2	S	Pierce	P	C, Standard	Y	Rayfield	G	M, Bosch	N	P, Borg & B	S, 4	Brown-L, 50	N	Arvac	302
303	Bethlehem, H		Own	4	4x5½-25.6	F	Pierce	T	C, Livingston	N	Zenith	G	M, Bosch	Y	P, Borg & B	S, 3	Fuller, G5	N	Universal	303
304	Bets, D2	2,785	Buda, HU	4	4½x5½-28.9	FS	Pierce	P	T, Chicago	Y	Stromberg	G	M, Bosch	N	M, Brown-L	S, 4		N	Peters	304
305	Brockway, K4	3,000	Continental, C2	4	4½x5½-27.2	S	N	P	T, Bush	Y	Stromberg	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 35	N	Spicer	305
306	Chicago, C2½	3,250	Hercules, CU3	4	4x5½-25.6	F	Simplex	P	T, Own	N	Stromberg	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 35	N	Peters	306
307	Clydesdale, 65X	3,540	Continental, C4	4	4½x5½-27.2	S	Own	P	T, Own	Y	Zenith	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 50	N	Spicer	307
308	Columbia, G	2,750	Hinkley, 400	4	4x5½-25.6	F	Hinkley	P	T, Long	N	Stromberg	G	M, Bosch	N	P, Detlaff	S, 3	Covert, RA3	N	Spicer	308
309	Concord, B	2,850	Buda	4	4½x5½-28.9		Monarch	P	T, Bush		Zenith		M, Eisemann		M, Brown-L	S, 3	Brown-Lipe		Spicer	309
310	Dart, M	3,000	Buda, HU	4	4½x5½-28.9	F	Pierce	P	C, Own	N	Zenith	G	M, Eisemann	N	M, Fuller	S, 4	Fuller, GU	Y	Spicer	310
311	Day-Elder, C	2,750	Buda	4	4½x5½-32.4		Monarch	P	T, Bush		Zenith		M, Berling		M, Covert	S, 3	Covert		Hartford	311
312	DeKalb, E2½	2,600	Continental	4	4½x5½-27.2		N	P	T, Jackson		Master		M, Eisemann	N	M, Fuller	S, 3	Fuller		Hartford	312
313	Denby, 25	3,250	Continental, C2	4	4½x5½-27.2	F	Monarch	P	T, Long	Y	Stromberg	G	M, Eisemann	N	M, Fuller	S, 4	Fuller, GU	N	Universal	313
314	Dependable, E	2,750	Buda, HTU	4	4½x5½-28.9	F	Pierce	P	T, Long	N	Zenith	G	M, Dixie	N	M, Fuller	S, 4	Fuller, G5	N	Acme	314
315	Doane	3,750		4	4½x5½-28.9	FS		P					M, Bosch		M	S, 3	Brown-Lipe			315
316	Erie		Continental	4	4½x5½-27.2		Pierce		T		Stromberg		M, Bosch		M	S, 4				316
317	Fageol	3,400	Waukesha.RU4R	4	4½x5½-28.9	S	Waukesha	P	C, Modine	N	Zenith	DG	M, Dixie	N	M, Brown-L	S, 5	Own	Y	Spicer	317
318	Gary, J	3,150	Buda, HTU	4	4½x5½-28.9	F	McCanna	P	T, Chicago	Y	Master	G	M, Eisemann	N	M, Fuller	S, 4	Fuller, GU	N	Blood	318
319	Gersix, G	3,150	Buda, LSU	4	4½x5½-28.9	F	Simplex	P	T, Chicago		Stromberg		M, Bosch		P, Borg & B	I, 3	Cotta, BUA			319
320	Gersix, K	3,150	Buda, HU	4	3½x5½-19.6	S	Monarch	P	C, Ideal		Stromberg		M, Bosch		P, Borg & B	I, 3	Cotta, BUA			320
321	Gramm-Bernstein, 25	3,875		4	4½x5½-28.9	F		P	T, Own	Y	Stromberg	G	M, Eisemann	N	M, Own	I, 4	Own	N	Own	321
323	Hahn, E	2,500	Continental, E4	4	4½x5½-32.4	FS	Pierce	P	T, Chicago		Stromberg		M, Bosch		M, Brown-L	S, 3	Brown-Lipe			323
324	Hal-Fur, B	2,750	Buda	4	4½x5½-28.9		Duplex	P	T, G & O		Stromberg		M, Bosch	N	P, Borg & B	S, 4	Brown-Lipe		Peters	324
325	Harvey, WFA	3,300	Buda	4	4½x5½-28.9		Duplex	P	T, Chicago		Stromberg		M, Eisemann		P, Borg & B	S, 4	Brown-Lipe		Spicer	325
326	Hawkeye, M	2,650	Buda	4	4½x5½-28.9		Simplex	P	T, Ideal		Zenith		M, Eisemann		M, Fuller	S, 4	Fuller		Hartford	326
327	Hurlburt	3,750	Buda	4	4½x5½-28.9	FS	Duplex	P	T, Own		Flechter		M, Eisemann	N	M, Brown-L	S, 3	Brown-L, 35			327
328	Indiana, 25	3,350	Own	4	4½x5½-27.2	F	Pierce	P	T, Long	Y	Stromberg	G	M, Eisemann	N	P, Borg & B	S, 4	Brown-L, 50	N	Acme	328
329	Jumbo, 25		Buda, HU	4	4½x5½-28.9	F	Duplex	P	T, Own	N	Zenith	G	M, Eisemann	N	M, Fuller	S, 4	Fuller, GU5	Y	Arvac	329
330	Kalamazoo, H		Wisconsin	4	4x6-25.6	F	Pierce	P	T, G & O	Y	Stromberg	G	M, Bosch	Y	M, Fuller	S, 4	Fuller, G5	N	Acme	330
331	Kankakee, E	2,465	Continental N9	6	3½x5½-25.3	FS		P	C, Auto	N	Zenith	G	B	Y	M, Muncie	S, 3	M'e AS-5-T23N	N	Acme	331
332	Kelly-Sp'gf'ld.K35(ch'n)	3,500	Own	4	3½x5½-22.5	F	Pierce	P	C, Long	N	Zenith	G	M, Eisemann	N	C, Own	S, 3	Covert, O	N	Own	332
333	Kelly-Sp'gf'ld.K36(w'm)	3,500	Own	4	3½x5½-22.5	F	Pierce	P	C, Long	N	Zenith	G	M, Eisemann	N	C, Own	S, 3	Covert, O	N	Spicer	333
335	Kimball, C	3,975	Wisconsin, UU	4	4½x6-28.9	FS	Duplex	P	C, Flexo	N	Zenith	D	M, Berling	N	M, Brown-L	S, 4	Brown-L, 50	N	Spicer	335
335a	Kissel, Freighter	3,475	Own	4	4½x5½-28.9	S	Pierce	P	T, Fedders	N	Stromberg	G	M, Eisemann	N	M, Warner	S, 4	Warner, T53	N	Spicer	335a
336	Kleiber, B	3,800	Continental, E4	4	4½x5½-32.4	S	Pierce	P	T, R'e-T'n'y	N	Stromberg	G	M, Bosch	N	M, Hele-Shaw	S, 4	Brown-L, 60-4	N	Spicer	336
337	Koehler, M	3,365	Hercules, CU3	4	4x5½-25.6	F	Simplex	P	T, Long	Y	Zenith	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 35	N	Spicer	337
338	K-Z	2,950	Continental, C4	4	4½x5½-27.2	S	Pierce	P	T, Chicago	Y	Stromberg	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 50	N	Thermoid	338
339	Larrabee, SK		Continental, C4	4	4½x5½-27.2	S	Simplex	P	T, Bush	N	Schebler	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 50	N	Spicer	339
340	L.M.C, 2-20	2,950	Continental, C2	4	4½x5½-27.2	S	Pierce	P	T, Long	N	Stromberg	G	M, Bosch	N	P, Borg & B	S, 4	Detroit, H	N	Baker	340
341	Maccar, H	3,500	Continental, E4	4	4½x5½-32.4	F	Pierce	P	T, Own	N	Stromberg	G	M, Eisemann	N	M, Brown-L	S, 3	Brown-L, 50	N	Spicer	341
342	Mapleleaf, BB		Hinkley, HA500	4	4½x5½-28.9	FS	Hinkley	P	T, McCord	Y	Stromberg	G	M, Bosch	N	M, Fuller	S, 4	Fuller, GU5	N	Blood	342
342a	Master, D, (int.)	3,540	Buda, HU	4	4½x5½-28.9	F	McCanna	P	T, Own	N	Master	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 35	Y	Spicer	342a
342b	Master, W, (worm)	3,290	Buda, HU	4	4½x5½-28.9	F	McCanna	P	T, Own	N	Master	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 35	Y	Spicer	342b
343	Midland, S	3,150	Buda, HU	4	4½x5½-28.9	F	Duplex	P	T, Chicago		Stromberg		M, Eisemann		P, Borg & B	S, 4	Brown-L, 50			343
344	Moreland, 19C	3,775	Continental	4	4½x5½-32.4	FS	N	P	T, Own	N	Master	D	M, Dixie	N	M, Own	S, 4	Own	N	Thermoid	344
344a	Nelson & LeMoon, F2½		Continental	4	4½x5½-27.2		Pierce	P	T, Chicago		Stromberg		M, Bosch	N	M, Brown-L	S, 3	Brown-Lipe		Thermoid	344a
345	Netco, H	3,500	Continental, E4	4	4½x5½-32.4	S	N	P	T, R'e-T'r'y	N	Zenith	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 50	N	Hartford	345
346	Noble, D50		Buda	4	4½x5½-28.9		Pierce	P	T, Chicago		Stromberg		M, Eisemann		M, Fuller	S, 4	Fuller		M & E	346
347	Ogden, C2		Continental, C2	4	3½x5-22.5	S	Pierce	T	T, Chicago	Y	Rayfield	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 30		Acme	347
347a	O. K., L	3,250	Buda, HTU	4	4½x5½-28.9	FS	Pierce	P	T, R'me-T'n'y		Zenith		M, Eisemann		M, Fuller	S, 4	Fuller, GU5		Hartford	347a
348	Old Reliable, B	3,250	Wisconsin, UU	4	4½x6-28.9	F	Monarch	P	T, Chicago	Y	Stromberg	G	M, Bosch	N	M, Fuller	S, 4	Fuller, G	Y	Spicer	348
349	Paige, 50-18			4	4½x5½-27.2		Pierce	P	T	Y	Stromberg	G	M, Bosch	N	M, Brown-L	S, 4	Brown-Lipe	N	Spicer	349
350	Patriot, Washington	3,450	Hinkley, HA	4	4½x5½-32.4	F	Hinkley	P	T, Own	N	Stromberg	G	M, Splitdorf	N	M, Covert	S, 4	Covert, RA4	N	Thermoid	350
351	Reliance, B20	3,200	Buda, HTU	4	4½x5½-28.9	F	Pierce	P	T, Bush	N	Stromberg	G	M, Eisemann	Y	M, Fuller	I, 4	Cotta, R	N	Peters	351
352	Republic, 19		Continental, C2	4	4½x5½-27.2	FS	Pharo	P	C, Own	N	Stromberg	G	M		M, Fuller	S, 4	Fuller, GU5	N	Spicer	352
353	Reynolds, 5A	3,800	Own	4	4½x5½-28.9	F	Hinkley	P	T, Own	Y	Stromberg	dgk	M, Bosch	Y	M, Own	S, 4	Own		Thermoid	353
354	Rowe, CDW	3,575	Wisconsin	4	4x5-25.6	F	Simplex	P	Fedders		Zenith		M, Bosch	N	M, Brown-L	S, 4	Brown-Lipe		Spicer	354
355	Royal	3,500	Wisconsin	4	4½x6-28.9		Monarch	T	T, Kells		Stromberg		M, Bosch		P, Borg & B	I, 3	Own			355
356	Sandow, J	2,975	Continental, C4	4	4½x5½-27.2	S	Monarch	P	T, Chicago	Y	Stromberg	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 35	N	Spicer	356
357	Sanford, W25	3,290	Cont nental, C4	4	4½x5½-27.2	F	Pierce	P	T, Long	N	Stromberg	G	M, Bosch	N	P, Borg & B	S, 4	Brown-L, 35	N	Spicer	357
358	Schacht		Buda, HU	4	4½x5½-28.9	F	Duplex	P	T, Own	N	Schebler	G	M, Bosch	N	C, Own	S, 4	Own	N	M & E	358
359	Schwartz, C2	2,675	Continental, K4	4	4½x3½-27.2	F	Pierce	P	C, Fedders	N	Stromberg	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, 50	N	M & E	359
360	Selden, 2½A		Continental, C4	4	4½x5½-27.2	S	Pierce	P	T, Long	Y	Stromberg	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 35	N	Spicer	360
361	Service, 51	3,475	Buda, HU	4	4½x5½-28.9	F	Simplex	P	T, Long	N	Stromberg	G	M, Eisemann	N	P, Borg & B	S, 4	Brown-L, 50	N	Spicer	361
361a	Signal, J	3,275	Continental, C4	4	4½x5½-27.2	FS	Pierce	P	T, McCord	Y	Stromberg	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 50	N	Spicer	361a
361b	Standard, 76		Continental, C2	4	4½x5½-27.2	FS	Monarch	P	T, Long	Y	Stromberg	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 35	N	Spicer	361b
362	Sterling	3,475	Own	4	4½x5½-30.6	F	Waukesha	P	C, Own	Y	Rayfield	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 50	N	Spicer	362

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TRUCK SPECIFICATIONS — 5,000 (Acason—Sterling)

Line no.	Final drive (Bevel, Chain, Internal-gear, Spur-and-bevel, Worm) and make of rear axle and model number.	Hotchkiss drive? (Yes or No)	Differential (Bevel, Spur, Worm) and make.	Number and location of driving-wheels (Front, Rear).	Clearance under front and rear axles.	Service and emergency brakes (Contracting, Expanding).	Frame material (Pressed-steel, Rolled-steel) and make.	Front and rear springs (Cantaliver; 1-2, 3-4, or Full elliptic; Transverse).	Make of springs.	Leaves in front and rear springs.	Length and width of front and rear springs.	Driver's position (Left, Right).	Make of steering gear.	Turning-circle diameter (feet and inches).	Wheels (Iron, Steel, Wood) and make.	Wheel-base (standard).	Front and rear tire sizes (dual, pneumatic).	Weight of chassis (pounds).	Perc. of weight on rear axle when empty & when loaded.	Line no.
294	W, Timken, 6560..	Y	W	2, R	13, 10	E, E	P, Savage....	½, ½	Detroit.....	10, 14	40x2½-50x3....	L	Ross.....	.....	W, Bimel...	150	36x4-36x8.....	4,850	—, 76	294
295	W, Timken, 6560..	Y	W	2, R	11½, 9½	E, E	P, Parish & B..	½, ½	Mather.....	10, 12	39x2½-54x3....	L	Ross.....	60, 0	S. Dayton..	156	36x6p-40x8p.....	5,650	25, 60	295
295a	I, Torbensen	....	W, Powrlok.	2, R	.....	.. .	P.....	½, ½	.....	10, 12	40x2½-54x3.....	....	.....	.....	W.....	130	34x4-34x6.....	.....	.....	295a
296	I, Torbensen.....	Y	B	2, R	11, 13½	C, E	R.....	½, ½	Detroit.....	10, 13	39½x2½-52½x3...	L	Lavine.....	.....	W, Bimel...	150	36x4-36x6.....	4,510	—, 66	296
297	W, Timken, 1540B	N	W	2, R	10, 10	E, E	P.....	½, ½	Mather.....	7, 9	42x2½-60x3.....	L	Ross.....	52, 0	W, St. M'rys.	148	36x4-36x4.....	4,600	60, 80	297
298	W, Timken, 6560..	Y	B	2, R	15, 9½	E, E	P.....	½, ½	Spring Perch	9, 12	41½x2½-54x3....	R	Gemmer..	55, 9	W, Arch'b'ld	153½	36x4-36x4d.....	5,070	.....	298
299	W, Wisc., 900C...	N	W	2, R	11, 10	E, C	R, Own.....	½, ½	Tuthill.....	9, 14	40x2½-52x3.....	L	Ross.....	44, 0	W, Schwars.	152	36x4-36x8.....	5,000	55, 75	299
300	W, Timken.....	N	W	2, R	14, 12	C, E	P.....	½, ½	Higgins.....	9, 15	40x2½-52x3½....	L	Lavine..	48, 0	W, Bimel...	144	36x5-36x8.....	4,200	30, 75	300
301	I, Russel.....	Y	B	2, R	11, 14	C, E	R, Own.....	½, ½	Detroit.....	9, 14	42x2½-56x3.....	L	Gemmer..	52, 0	W, Bimel...	146	34x4-34x6.....	4,200	50, 70	301
302	I.....	N	B	2, R	9½, 12	C, E	P.....	½, ½	Perfection..	10, 12	41½x2½-56x3....	L	Ross.....	.....	W, Schwars.	158	36x4-36x4d.....	4,625	50, 75	302
303	I, Russel, RI300..	Y	B	2, R	12½, 13½	C, E	P, Detroit.....	½, ½	Mather.....	9, 11	40x2½-56x3.....	L	Lavine...	51, 0	I. Smith....	143	34x4-34x6.....	3,950	—, 90	303
304	W, Timken, 6560..	Y	B	2, R	11, 9	E, E	P, Parish & B..	½, ½	Temme.....	8, 14	40x2½-55x3.....	L	Ross.....	35, 0	S. Dayton..	150	36x4-36x7.....	4,750	75, —	304
305	W, Timken, 6560..	N	B	2, R	.....	E, E	P.....	½, ½	Merrill.....	10, 13	43x2½-51½x3....	L	Gemmer..	.....	W, Hoopes..	152	36x4-36x7.....	4,850	54, 84	305
306	W, Timken, 6560..	Y	B	2, R	12 ,9	E, E	R, Own.....	½, ½	Mather.....	9, 13	40x2½-54x3.....	L	Gemmer..	.....	W, Standard	156	36x4-36x7.....	4,610	60, 75	306
307	W, Timken, 6560..	N	B	2, R	11½, 9	E, E	P, Parish & B..	½, ½	Perfection..	7, 10	44x3-52x3.....	L	Ross.....	61, 0	I, Smith....	163	36x4-36x7.....	4,850	60, 80	307
308	I, Russel, NI-400..	Y	B	2, R	.....	C, E	R.....	½, ½	Perfection..	9, 11	40x2½-52x3½....	L	Own.....	.....	W, St. M'rys.	144	36x4-36x7.....	5,100	.....	308
309	W, Timken.....	....	.....	2, R	.....	E, E	P, Parish & B..	....	Spring Perch	.....	.....	L	Ross.....	.....	W, Crane...	150	36x4-36x4d.....	.....	.....	309
310	W, Own.....	Y	B	2, R	10½, 10½	E, E	P, Savage.....	½, ½	Perfection..	8, 11	39x2½-56x3.....	L	Ross.....	50,0	W, Prudden.	150	36x4-36x7.....	4,750	50, 80	310
311	W, Wisconsin.....	....	.....	2, R	.....	E, E	P, Savage.....	....	Iron City...	.....	.....	L	Ross.....	.....	W, Jones...	150	36x4-36x7.....	.....	.....	311
312	W, Timken.....	....	.....	2, R	.....	E, E	P, Parish.....	....	Mather.....	.....	.....	L	Ross.....	.....	W, Schwars.	136	36x4-36x6.....	.....	.....	312
313	I, Russel, U.....	Y	B	2, R	10, 13	C, E	P, Detroit.....	½, ½	Detroit.....	10, 14	44x2½-54x3½...	L	Gemmer..	57, 1	S, Dayton..	149½	36x4-36x7.....	4,790	52, 79½	313
314	W, Wisc., 900C...	Y	W	2, R	10, 10	E, C	P.....	½, ½	Perfection..	11, 14	42x2½-52x3.....	L	Ross.....	36, 0	W, Bimel...	157	36x4-36x7.....	5,600	40, 70	314
315	C.....	....	.....	2, R	.....	E, E	P.....	½, ½	.....	.....	.....	.....	.....	.....	W.....	156	36x5-36x7.....	.....	.....	315
316	W, Timken.....	....	.....	....	.....	....	P.....	....	.....	.....	.....	.....	Ross.....	.....	.....	160	34x4-36x5.....	.....	.....	316
317	W, Timken, 6560..	Y	B	2, R	9½, 10	E, C	R, Own.....	½, ½	Mather.....	9, 13	41x2½-56x3.....	L	Ross.....	56, 1	W, Prudden.	144	34x4-36x7.....	4,600	50, 71	317
318	W, Timken, 6560..	Y	W	2, R	12, 10½	E, E	P.....	½, ½	Tuthill.....	11, 13	44x2½-52x3.....	L	Ross.....	42, 0	W, Prudden.	148	36x4-36x7.....	4,850	50, 20	318
319	W, Own.....	....	.....	2, R	.....	C, E	R, Own.....	½, ½	Tuthill.....	.....	.....	.....	Ross.....	.....	W, Jones...	150	36x4-36x7.....	.....	.....	319
320	W, Own.....	....	.....	2, R	.....	C, E	R, Own.....	½, ½	Tuthill.....	.....	.....	.....	Ross.....	.....	W, Jones...	150	36x4-36x7.....	.....	.....	320
321	W, Standard.....	Y	B	2, R	.....	E, E	P, Own.....	½, ½	Perfection..	.....	46x2½-58x3.....	L	Ross.....	59, 6	I, Smith....	150	36x4-36x4d.....	5,300	73½, 91	321
323	W, Timken.....	....	.....	2, R	.....	....	P.....	....	Delaney.....	.....	.....	.....	Ross.....	.....	W.....	156	36x4-36x4d.....	.....	.....	323
324	W, Timken.....	....	.....	2, R	.....	E, E	P, Parish & B..	....	Spring Perch	.....	.....	L	Gemmer..	.....	S, Massillon.	168	35x5-36x7.....	.....	.....	324
325	W, Sheldon.....	....	.....	2, R	.....	E, E	R, Own.....	....	Sheldon.....	.....	.....	L	Ross.....	.....	W, Schwars.	150	36x4-36x7.....	.....	.....	325
326	I, Clark.....	....	.....	2, R	.....	C, E	R, Own.....	½, ½	Detroit.....	.....	.....	L	Ross.....	.....	W, Bimel...	148½	36x4-36x6.....	.....	.....	326
327	W, Hindley.....	....	.....	2, R	.....	E, C	P, Savage.....	½, ...	Perfection..	.....	.....	.....	Ross.....	.....	W, Wayne..	170	36x4-36x4d.....	.....	.....	327
328	W, Sheldon, W21..	N	B	2, R	12½, 9½	E, E	R.....	F, ½	Sheldon.....	9, 14	40x2½-50x3.....	L	Wohlrab..	50, 0	W, Bimel...	156	36x4-36x8.....	6,000	61, 71½	328
329	I, Clark, 2D.....	Y	B	2, R	10, 11½	C, E	P.....	½, ½	Detroit.....	9, 14	40x2½-54x3.....	L	Jacox....	45, 0	S, Clark....	152½	36x4-36x7.....	4,800	50, 75	329
330	W, Sheldon, W21..	N	W	2, R	9½, 9	E, E	R.....	½, ½	Sheldon.....	8, 13	42x2½-56x3.....	L	Ross.....	34, 3	I, Smith....	160	36x4-36x8.....	6,200	—, 80	330
331	I, Russel, S.....	Y	B	2, R	9, 13½	C, E	R, Own.....	½, ½	Temme.....	9, 11	39½x2½-49½x3...	L	Ross.....	.....	W, Bimel...	170	34x4-34x6.....	4,200	30, 70	331
332	C, Own.....	N	B	2, R	9½, 16	E, E	P.....	½, ½	Perfection..	11, 13	40x2½-44x2½...	L	Gemmer..	48, 0	W.....	144	36x4-36x4d.....	5,200	50, 90	332
333	W, Own.....	N	B	2, R	9½, 9½	E, E	P.....	½, ½	Perfection..	11, 12	40x2½-47½x3.....	L	Gemmer..	48, 0	W.....	144	36x4-36x4d.....	5,540	50, 90	333
335	W, Sheldon, W21..	Y	B	2, R	.....	E, C	P, Parish.....	½, ½	U. S.....	11, 13	40½x2½-50½x3...	L	Ross.....	39, 6	I, Smith.....	.....	36x6p-36x8.....	.....	50. 80	335
335a	W, Timken, 6560..	Y	W	2, R	10½, 10	E, E	P, Smith.....	½, ½	Mather.....	10, 11	38x2½-54x3.....	L	Lavine...	50, 0	W Prudden.	168	36x4-36x7.....	5,200	57½, 76	335a
336	W, Sheldon, W21..	Y	W	2, R	9½, 9½	E, E	R, Own.....	½, ½	Betts.....	8, 14	44x3-52x3.....	R	Lavine...	.....	W, Wat'rb'se	160	36x5-36x8.....	5,900	50, 75	336
337	W, Timken, 6560..	Y	B	2, R	12, 9½	E, E	P, Parish & B..	½, ½	Mather.....	10, 12	40x2½-56x3.....	L	Lavine...	.....	W, Wayne..	162	36x4-36x7.....	5,000	50, 75	337
338	W, Timken, 6560..	N	B	2, R	12½, 10½	E, E	R, Own.....	½, ½	Tuthill.....	8, 10	40x2½-50x3.....	L	Ross.....	64, 8	W, St. M'rys.	150	36x4-36x8.....	4,800	.....	338
339	W, Sheldon, W21..	Y	B	2, R	15, 10	E, E	P, Parish & B..	½, ½	Merrill.....	9, 13	41x2½-54x3.....	L	Ross.....	.....	W, Hoopes..	156	36x4-36x7.....	5,200	42, 86	339
340	I, Russel, S.....	Y	B	2, R	10½, 14½	C, E	R, Chopper....	½, ½	Mather.....	9, 11	42x2½-56x3.....	L	Lavine...	47, 0	W, Bimel...	164	36x4-36x4d.....	4,500	53, 75	340
341	W, Timken, 6560..	N	B	2, R	12½, 10	E, E	P, Parish.....	½, ½	Merrill.....	8, 12	42x2½-56x3.....	L	Ross.....	.....	S, Dayton..	162	36x4-36x4d.....	5,000	—, 70	341
342	W, Sheldon, W21..	Y	B	2, R	11½, 9½	E, E	R.....	½, ½	Sheldon.....	.....	44x2½-54x3.....	L	Ross.....	.....	W, Hayes..	150	36x4-36x4d.....	5,500	50, 70	342
342a	I, Walker.....	Y	BS	2, R	.....	C, E	P, Parish & B..	½, ½	Detroit.....	11, 13	44½x2½-52x3.....	L	Ross.....	42, 0	W, Prudden.	144	34x4-36x7.....	4,300	53, 76	342a
342b	W, Timken, 6560..	Y	B	2, R	9½, 10½	E, E	P, Parish & B..	½, ½	Detroit.....	11, 13	44½x2½-52x3.....	L	Ross.....	42, 0	W, Prudden.	144	34x4-36x7.....	4,500	53, 76	342b
343	W, Sheldon, W21..	....	.....	.....	.....	E, E	P, Parish & B..	½, ½	Sheldon.....	.....	.....	.....	Ross.....	.....	I, Smith....	150	36x4-36x7.....	.....	.....	343
344	W, Timken, 6552..	N	W	2, R	12, 10	E, E	P.....	½, ½	U. S.....	10, 11	39½x2½-50x3½...	L	Ross.....	50, 0	I, Smith....	144	36x4-36x7.....	5,400	50, 65	344
344a	W, Timken, 6560	Y	.....	2, R	.....	E, E	R, Own.....	½, ½	Tuthill.....	.....	.....	R	Lavine...	.....	W, Prudden.	.....	36x4-36x7.....	.....	.....	344a
345	W, Timken, 6560..	Y	B	2, R	12, 11	E, E	P.....	½, ½	Perfection..	10, 15	39x2½-49½x3.....	L	Ross.....	.....	W, Arch'b'ld	168	36x4-36x8.....	5,120	57, 65	345
346	W, Sheldon.....	....	.....	2, R	.....	E, E	P, Parish & B..	....	Tuthill.....	.....	.....	L	Lavine...	.....	W, Bimel...	162	36x4-36x8.....	.....	.....	346
347	W, Timken.....	Y	B	2, R	10, 10	E, E	P, Garden City.	C, C	Tuthill.....	8, 10	38x2½-50x2½...	L	Gemmer..	.....	W, Stanadrd	160	36x3½-36x4.....	3,400	—, 70	347
347a	W, Wisc., 900.....	....	.....	2, R	.....	E, E	P, Savage.....	½, ½	Liggett.....	.....	.....	.....	Ross.....	.....	W, Bimel...	150	336x4-36x8.....	.....	.....	347a
348	W, Sheldon, W21..	Y	W	2, R	10½, 9½	E, E	R.....	½, ½	Sheldon.....	9, 14	46x3-54x3.....	R	Ross.....	.....	W, St. M'rys.	160	34x4-36x4d.....	5,750	—, 70	348
349	W, Timken.....	N	B	2, R	.....	E, E	P.....	½, ½	Perfection..	.....	45x2½-54x3.....	L	Jacox.....	.....	S, Dayton..	150	34x4-34x4d.....	5,000	60, 40	349
350	W, Empire. O....	Y	B	2, R	10, 10½	E, E	P, Detroit.....	½, ½	Cooper.....	10, 15	44x2½-56x3.....	L	Ross.....	51, 10	W, Bimel...	156	36x4-36x7.....	5,200	49, 82	350
351	S, Own.....	N	B	2, R	10, 10½	E, E	P, Savage.....	½, ½	Sheldon.....	9, 11	46x2½-58x2½...	L	Ross.....	.....	W, Bimel...	156	36x4-36x4d.....	5,500	40, 85	351
352	I, Torbensen, D...	Y	W, Powrlok..	2, R	.....	E, E	P, Detroit.....	½, ½	Mather.....	9, 13	38½x2½-52½x3...	L	Jacox.....	.....	W.....	144	36x4-36x7.....	4,200	.....	352
353	W, Own.....	Y	B	2, R	11, 9½	E, E	R, Standard...	½, ½	Own.....	.....	40x2½-54x3.....	L	Own.....	.....	I. Smith....	154	36x4-36x8.....	.....	.....	353
354	W, Sheldon, W21..	....	.....	2, R	.....	E, E	R, Own.....	½, ½	Sheldon.....	.....	.....	L	Ross.....	.....	W, Hoopes..	162	34x4-36x4d.....	4,500	—, 64	354
355	W, Timken	....	.....	2, R	.....	E, E	R, Own.....	....	Merrill.....	.....	.....	.....	Ross.....	.....	W.....	132½	36x4½-36x6.....	.....	.....	355
356	W, Timken, 6560..	Y	W	2, R	9½, 9½	E, E	P, Savage.....	½, ½	Garden City	8, 13	38½x2½-54x3.....	R	Ross.....	36, 0	W, Standard	165	36x4-36x7.....	4,650	20, 70	356
357	W, Sheldon, W21..	Y	B	2, R	11, 9½	E, E	P.....	½, ½	Perfection..	9, 13	42x2½-52x3.....	L	Ross.....	58, 0	W, Hoopes..	174	36x4-36x4d.....	5,500	73, 87	357
358	W, Own.....	N	B	2, R	11, 9	C, E	R, Own.....	½, ½	National....	9, 14	35x2½-50x3.....	L	Own.....	.....	W, St. M'rys.	156	36x4-36x4d.....	6,000	80, 80	358
359	I, Torbensen, D...	Y	B	2, R	10, 11½	C, E	P, Parish.....	½, ½	Rowland....	10, 15	40½x2½-54x3.....	L	Ross.....	.....	W, Schwars.	150	34x4-34x7.....	4,200	.....	359
360	W, Timken, 6560..	N	B	2, R	12, 10½	E, E	P, Parish & B..	½, ½	Perfection..	9, 14	40x2½-54x3.....	R	Gemmer..	54, 0	W.....	145	36x4-36x7.....	5,400	56, 75	360
361	W, Timken, 6560..	Y	B	2, R	12, 9½	E, E	P.....	½, ½	Mather.....	10, 14	42x2½-54x3.....	L	Ross.....	48, 0	W, Bimel...	160	36x4-36x7.....	5,180	—, 70	361
361a	W, Timken, 6560..	N	B	2, R	11, 11	E, E	P, Savage.....	½, ½	Detroit.....	10, 13	44x2½-56x3.....	L	Ross.....	60, 0	W, Hayes...	150	34x4-36x8.....	5,210	—, 76	361a
361b	W, Timken, 6560..	N	B	2, R	12, 9½	E, E	R, Own.....	½, ½	.....	8, 12	38x2½-54x3.....	L	Ross.....	.....	W.....	140	36x4-36x7.....	4,430	59, 71	361b
362	W, Timken, 6560..	N	W	2, R	12½, 10	E, E	P, W.....	½c ½c	Mather.....	8, 12	48x3-54x3.....	L	Ross.....	52, 9	W, Prudden.	156	36x4-36x4d.....	5,500	58. 88	362

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5,000 (Super)—7,000 (Kelly-Springfield) INTERNAL-COMBUSTION

Line no.	Brand name and model name or number	Price f. o. b. factory with seat and tires but without body.	Make of engine and model number.	Number of cylinders.	Bore and stroke, and N. A. C. C. horse-power.	Lubrication (Forced-feed, Splash).	Make of gov-ernor (None).	Water-circulation (Pump, Thermo-siphon).	Radiator (Cellular, Tubular) and make.	Radiator guard included in price? (Yes or No)	Make of carbu-reter.	Fuels (Distillate, Gasolene, Kerosene).	Ignition (Battery, Magneto) and make of magneto.	Electric starting and lighting included in price? (Yes or No)	Clutch (Cone, Multiple-disk, Plate) and make.	Transmission (Individual-clutch, Planetary, Sliding-gear) and number of forward speeds.	Make of transmission and model number.	Power take-off included in price? (Yes or No)	Make of univer-sal joints.	Line no.
	5,000 Pounds—Con.																			
363	Super, 50	.....	Wisconsin, TAU.	4	4x6-25.6	F	Simplex	P	T, Chicago	Y	Zenith	G	M, Bosch	N	M, Fuller	S, 4	Fuller, GU	Y	Thermoid	363
364	Tiffin, MW	3,200	Continental, C4	4	4½x5½-27.2	FS	Pierce	P	T, Own	Y	Schebler	G	M, Bosch	N	M, Fuller	S, 4	Fuller, GU	Y	Peters	364
365	Titan	3,400	Buda, HTU	4	4½x5½-28.9	F	Simplex	P	T, B & W	N	Stromberg	G	M, Eisemann	N	P, Borg & B	I, 4	Cotta, AU	N	M & E	365
366	Tower, H	3,385	Continental, C4	4	4½x5½-27.2	S	Pierce	P	T, Own	N	.....	G	M	N	M, Fuller	S, 3	Fuller, TU	N	.....	366
367	Traylor, D	3,375	Buda, MTU	4	4½x5½-28.9	F	Pierce	P	T, G & O	N	Zenith	G	M, Dixie	N	M, Covert	S, 4	Covert	N	.....	367
368	Triangle, B	2,850	Waukesha, FU	4	4x5½-25.6	FS	Waukesha	P	T, Perfex	N	Stromberg	G	M, Eisemann	N	M, Fuller	S, 4	Fuller, GU	Y	Detroit	368
369	Ultimate, B	.....	Buda, HTU	4	4½x5½-28.9	F	Pierce	P	T, Own	N	Stromberg	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 50	N	Spicer	369
370	Union, F	3,150	Wisconsin, TAU.	4	4x6-25.6	F	Duplex	P	T, Own	N	Schebler	G	M, Eisemann	N	M, Fuller	S, 4	Fuller, GU	N	Universal	370
371	United, B	.....	Buda, HU	4	4½x5½-28.9	F	Simplex	P	T, G & O	....	Stromberg	....	M, Bosch	....	M, Brown-L	S, 4	Brown-L, 35	....	.....	371
372	U. S., H	3,250	Continental	4	4½x5½-27.2	....	Pierce	P	C, Fedders	....	Stromberg	....	M, Eisemann	....	C, Hartford	S, 4	Brown-L	....	Blood	372
373	Walker-Johnson, B	2,890	Buda, HTU	4	4½x5½-28.9	F	Pierce	P	T,	....	Zenith	....	M, Eisemann	....	M	S, 4	.....	....	.....	373
374	Ward LaFrance, 2B	3,590	.....	4	4½x5½-30.6	F	.....	P	T, Own	Y	Zenith	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 50	N	Spicer	374
375	Watson, 19	.....	Waukesha, CU	4	4½x5½-30.6	F	Waukesha	P	T, R'e-T'n'y	N	Stromberg	G	M, Simms	N	M, Brown-L	S, 4	Brown-L, 35	N	Spicer	375
375a	White Hickory, K	3,150	Continental, C2	4	4½x5½-27.2	FS	Simplex	P	T, Chicago	Y	Stromberg	G	M, Eisemann	N	M, Fuller	S, 4	Fuller, GU5	N	M & E	375a
376	Wichita, R	3,000	Waukesha, BX	4	3¾x5-22.5	P	Waukesha	P	C, Perfex	Y	Stromberg	G	M	N	C	I, 3	Cotta	N	Thermoid	376
376a	Wichita, RX	3,600	Beaver, JB	4	4½x6-28.9	P	Duplex	P	C, E & M	Y	Stromberg	G	M	N	C	I, –	Cotta	N	Thermoid	376a
377	Wilcox, C	.....	Own	4	4½x5-28.9	S	Pierce	P	T, Long	N	Stromberg	G	M, Bosch	N	C, Own	S, 4	Own	N	.....	377
378	Wilson	3,150	Continental, C4	4	4½x5½-27.2	FS	Pierce	P	T, Own	N	Marvel	G	M, Eisemann	N	P, Borg & B	S, 4	Brown-L, 50	N	Thermoid	378
379	Winther, 450	3,690	Wisconsin, EAU.	4	4x5-25.6	F	N	P	T, Bremer	N	Stromberg	G	M, Eisemann	N	M, Fuller	S, 3	Fuller, LTU5	N	Peters	379
380	Wisconsin, C	2,850	Waukesha	4	4x5¾-25.6	....	Waukesha	P	T, Chicago	....	Master	....	M, Eisemann	....	M, Fuller	S, 3	Fuller	....	.....	380
381	Witt-Will, P	2,950	Continental	4	4½x5½-27.2	....	Pierce	P	C, Modine	....	Zenith	....	M, Eisemann	N	M, Brown-L	S, 3	Brown-Lipe	....	Spicer	381
	6,000 Pounds:																			
382	A & B, 3T	4,500	Own	4	5¼x4¾-42.8	....	N	P	T, Bush	....	Schebler	....	M, Bosch	N	N	* 2	*	....	Franck	382
383	Beck, D	3,500	Continental	4	4½x5½-32.4	F	Pierce	P	C, Ideal	Y	Stromberg	G	M, Bosch	N	M, Cotta	I, 3	Cotta	Y	Blood	383
384	Beech Creek, 3A	3,850	Waukesha	4	4½x5½-28.9	....	Waukesha	P	.....	....	Master	....	M, Eisemann	....	M, Fuller	S, 3	Fuller	....	.....	384
384a	Douglas, I	3,350	Buda	4	4½x5½-28.9	....	Pierce	P	..., Own	....	Schebler	....	M, Eisemann	....	M, Fuller	S, 4	Fuller	....	Arvac	384a
385	Forschler, BX	3,450	Continental	4	4½x5½-27.2	....	Duplex	P	T, Own	....	Zenith	....	M, Bosch	....	M, Fuller	S, 4	Fuller	....	Own	385
386	FWD, B	4,750	Wisconsin, A	4	4½x5½-36.1	FS	Pierce	P	T, McCord	N	Stromberg	G	M, Eisemann	N	M, Hele-Shaw	I, 3	Cotta, DAF	N	Blood	386
387	Jumbo, 30	.....	Buda, HU	4	4½x5½-28.9	F	Duplex	P	T, Own	N	Zenith	G	M, Eisemann	N	M, Fuller	S, 4	Fuller, GU5	Y	Arvac	387
388	Kimball, K	4,400	Wisconsin, AU	4	4½x5½-36.1	FS	Duplex	P	C, Flexo	N	Zenith	D	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 50	N	Spicer	388
390	Packard, 3E	4,350	Own	4	4½x5½-32.4	F	Own	P	C, Fedders	N	Own	G	M, Dixie	N	M, Own	S, 4	Own	N	Ther.-Sp.	390
391	Riker, B	.....	Own	4	4½x6-28.9	S	Own	P	T	N	Own	G	M, Berling	N	C, Own	S, 4	Own	N	Own	391
392	Rowe, GSW (4-cyl.)	3,900	Wisconsin	4	4x5-25.6	F	Simplex	P	C, Fedders	....	Zenith	....	M, Bosch	N	M, Brown-L	S, 4	Brown-Lipe	....	Spicer	392
393	Rowe, GPW (8-cyl.)	4,950	Herschell-Spill	8	2½x5-16.2	F	N	P	C, Fedders	....	Zenith	....	Atwater-K	Y	M, Brown-L	S, 4	Brown-Lipe	....	Spicer	393
393a	Stoughton, F	.....	.....	4	4½x5½-28.9	F	Duplex	P	T, Chicago	Y	Stromberg	G	M, Eisemann	....	M, Brown-L	S, 4	Brown-L	Y	Thermoid	393a
394	Vim, 23	3,950	Hercules	4	4½x5½-28.9	F	Duplex	P	T, McCord	N	Zenith	G	M, Dixie	N	M, Brown-L	S, 4	Brown-L, 50	N	Spicer	394
395	Walter (N. Y.), T	.....	Waukesha, CU	4	4½x5½-30.6	F	Own	P	T, Bush	Y	Stromberg	G	M, Simms	Y	M, Brown-L	S, 4	Brown-L, 50	....	M & E	395
396	White, 40	4,500	Own	4	3¾x5½-22.5	F	Own	P	T, Own	N	Own	G	M	N	P, Own	S, 4	Own	N	Own	396
	7,000 Pounds:																			
397	Acason, L	4,900	Waukesha, DU	4	4½x6½-32.4	F	Waukesha	P	C, National	Y	Stromberg	G	M, Eisemann	N	M, Dethaff, H8	I, 4	Cotta, R	Y	Blood	397
398	Acme, C	4,050	Continental, E7	4	4½x5½-32.4	FS	Duplex	P	T, G & O	N	Rayfield	G	M, Eisemann	N	P, Borg & B	I, 4	Cotta, C	N	Blood	398
399	All-Power, SV4	4,800	Continental	4	4½x5½-32.4	....	Pharo	P	T, McCord	....	Zenith	....	M, Eisemann	Y	M, Detlaff	I, 3	Cotta	....	Universal	399
400	Armleder, KW	.....	Continental, E4	4	4½x5½-32.4	FS	.....	P	T	N	Zenith	G	M, Bosch	N	M, Brown-L	S, 3	Brown-L, U50	N	Spicer	400
401	Atterbury, 7D	4,175	Continental, E4	4	4½x5½-32.4	FS	Monarch	P	T, Own	N	Zenith	G	M	N	M, Brown-L	S, 4	Brown-L, 50	N	Spicer	401
402	Available, H3½	4,200	Continental, E4	4	4½x5½-32.4	FS	Pierce	P	T, Chicago	Y	Stromberg	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 50	N	Ther.-Sp.	402
403	Belmont, D	3,550	Buda, YU	4	4½x6-32.4	F	Pierce	P	T, Chicago	Y	Zenith	G	M, Eisemann	N	M, Fuller	S, 4	Fuller, G	N	Sterling	403
404	Bethlehem, J	.....	Own	4	4½x5½-32.4	F	Pierce	T	C, Livingston	N	Zenith	G	M, Bosch	Y	P, Borg & B	S, 4	Fuller, G5	N	Universal	404
405	Brockway, R2	3,900	Continental, E4	4	4½x5½-32.4	S	N	P	T, Bush	Y	Stromberg	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 50	N	Spicer	405
406	Chicago, C3½	4,450	Hercules, MU3	4	4½x5½-32.4	F	Simplex	P	T, Own	N	Stromberg	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 50	N	Peters	406
407	Clydesdale, 90	4 400	Continental, E4	4	4½x5½-32.4	S	Own	P	T, Own	Y	Zenith	G	M, Bosch	N	M, Brown-L	S, 4	Brown-L, 60	N	Spicer	407
408	Dart, W	4,000	Buda, YU	4	4½x6-32.4	F	Pierce	P	C, Own	N	Zenith	G	M, Eisemann	N	M, Fuller	S, 4	Fuller, HU	Y	Spicer	408
409	Day-Elder, F	3,350	Continental	4	4½x5½-32.4	....	Monarch	P	T, Bush	....	Zenith	....	M, Berling	....	M, Brown-L	S, 4	Brown-Lipe	....	Hartford	409
410	Denby, 27	4,250	Continental, E7	4	4½x5½-32.4	F	Monarch	P	T, Long	Y	Stromberg	....	M, Eisemann	N	M, Own	S, 4	Fuller, G5	N	Universal	410
411	Diamond T, K	4,825	.....	4	4½x5½-28.9	FS	.....	P	T, G & O	N	Stromberg	G	M, Bosch	N	M	S, 4	.....	N	Spicer	411
412	Dorris, K7	4,400	Own	4	4½x5½-28.9	F	Own	P	T, McCord	Y	Stromberg	G	M, Bosch	N	M, Warner	S, 4	Warner, T53	N	Spicer	412
413	Duplex, E	4,250	Buda, TU	4	4½x5½-28.9	S	Duplex	P	T, Long	N	Schebler	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 50	Y	Peters	413
414	Erie	.....	Continental	4	4½x5½-32.4	....	Pierce	....	T	....	Stromberg	....	M, Bosch	....	.....	S, 4	.....	....	.....	414
415	Fageol	4,500	Waukesha, DU	4	4½x6½-32.4	S	Waukesha	P	C, Modine	N	Zenith	DG	M, Dixie	N	M, Brown-L	S, 5	Own	Y	Spicer	415
416	Federal, WD	3,850	Continental, E4	4	4½x5½-32.4	FS	Pharo	P	T, McCord	Y	Zenith	G	M, Eisemann	N	P, Borg & B	S, 4	Warner, AXD	N	Spicer	416
417	Garford, 77C	4,300	.....	4	4¾x5½-36.1	F	Simplex	P	T, Own	N	Rayfield	G	M, Splitdorf	N	M	S, 4	.....	N	.....	417
418	Garford, 77D	4,190	.....	4	4½x6-32.4	F	Simplex	P	T, Own	N	Rayfield	G	M, Splitdorf	N	M	S, 4	.....	N	.....	418
419	Gary, KL	4,150	Buda, YTU	4	4½x6-32.4	F	McCanna	P	T, Chicago	Y	Master	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 50	N	Spicer	419
420	Giant, 17	4,150	Continental, E4	4	4½x5½-32.4	FS	Pierce	P	C, Own	Y	Stromberg	G,K	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 50	N	.....	420
421	GMC, 71A	4,225	Continental, E4	4	4½x5½-32.4	FS	Monarch	P	T, Own	N	Marvel	G	M, Eisemann	N	M, Own	S, 4	Own	N	Own	421
422	Gramm-Bernstein, 35	4,775	.....	4	4½x5½-32.4	F	.....	P	T, Own	Y	Stromberg	G	M, Eisemann	N	M, Own	I, 4	Own	N	Own	422
423	Hall	3,750	Continental, E4	4	4½x5½-32.4	FS	Simplex	P	T, G & O	Y	Zenith	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 50	N	Hartford	423
424	Harvey, WHA	4,300	Buda	4	4½x6-32.4	....	Duplex	P	T, Chicago	....	Stromberg	....	M, Eisemann	....	P, Borg & B	S, 4	Brown-Lipe	....	Spicer	424
425	Hendrickson	3,800	Buda	4	4½x5½-28.9	....	Pierce	P	T, Chicago	....	Stromberg	....	M, Dixie	N	M, Fuller	S, 4	Fuller	....	.....	425
426	Hurlburt, C	4,400	Buda, YTU	4	4½x6-32.4	FS	Duplex	P	T, Own	....	Flechter	....	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 50	....	.....	426
427	Indiana, 35	4,150	Own	4	4¾x5½-30.6	F	Pierce	P	T, Long	Y	Stromberg	G	M, Eisemann	N	P, Borg & B	S, 4	Brown-L, 50	N	Spicer	427
428	International, L	4,500	Own	4	4½x5-28.9	FS	Own	T	T, Long, McC	Y	Ensign	G	M, Dixie	N	M, Own	S, 4	Brown-L	N	Own	428
429	Jackson, C1920	4,250	Continental	4	4½x5½-32.4	....	Pierce	P	T, Long	....	Stromberg	....	M, Eisemann	....	P, Borg & B	S, 4	Own	....	Spicer	429
430	Jumbo, 35	.....	Buda, YTU	4	4½x6-32.4	F	Duplex	P	T, Own	Y	Zenith	G	M, Eisemann	N	M, Brown-L	S, 4	Brown-L, 50	Y	Spicer	430
431	Kalamazoo, K	.....	Wisconsin	4	4½x6-28.9	F	Pierce	P	T, G & O	Y	Stromberg	G	M, Bosch	Y	M, Fuller	S, 4	Fuller, G5	N	Acme	431
432	Kelly-Sp'gf'ld K40(ch'n)	4,400	Own	4	4¾x6½-32.4	F	Pierce	P	C, Long	N	Zenith	Y	M, Eisemann	N	C	S, 3	Covert, K	N	Own	432

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TRUCK SPECIFICATIONS

5,000 (Super)—7,000 (Kelly-Springfield)

Line no.	Final drive (Bevel, Chain, Internal-gear, Spur-and-bevel, Worm) and make of rear axle and model number.	Hotchkiss drive? (Yes or No)	Differential (Bevel, Spur, Worm) and make.	Number and location of driving-wheels (Front, Rear).	Clearance under front and rear axles.	Service and emergency brakes (Contracting, Expanding).	Frame material (Pressed-steel, Rolled-steel) and make.	Front and rear springs (Cantaliver; 1-2, 3-4, or Full elliptic; Transverse).	Make of springs.	Leaves in front and rear springs.	Length and width of front and rear springs.	Driver's position (Left, Right).	Make of steering gear.	Turning-circle diameter (feet and inches).	Wheels (Iron, Steel, Wood) and make.	Wheel-base (standard).	Front and rear tire sizes (dual, pneumatic).	Weight of chassis (pounds).	Perc. of weight on rear axle when empty & when loaded.	Line no.
363	W, Sheldon, W21..	Y	B	2, R	11½, 9¾	E, E	P.....	½, ½	Sheldon....	10, 12	40x2½-50x3....	L	Lavine...	49, 0	W.....	156	36x4-36x8.....	5,250	.....	363
364	W, Sheldon, W21..	N	B	2, R	10, 11	E, E	P.....	½, ½	Kalamazoo.	11, 14	44x2½-50x3....	L	Ross.....	52, 0	I, Smith....	148	36x4-36x3½d.....	4,890	40, 60	364
365	I, Clark, 2D.....	N	B	2, R	11, 14	E, C	P, Parish & B..	½, ½	Sheldon....	9, 11	46x2½-54x3....	L	Wohlrab..	38, 0	W.....	156	34x4-36x4d.....	4,975	51, 78	365
366	W, Timken.....	N	B	2, R	11, 11	E, E	P.....	½, ½	Detroit.....	.....	44x2½-56x3....	L	Ross.....	.....	W.....	146	36x4-36x7.....	4,700	—, 75	366
367	W, Sheldon, W21..	Y	W	2, R	.....	E, E	P, Savage.....	½, ½	.....	.....	40x2½-52x3....	L	Ross.....	.....	W, Schwarz.	150	36x4-36x7.....	5,500	.....	367
368	I, Clark, 2D.....	Y	W, Powrlok..	2, R	13, 11	C, C	R.....	½, ½	Detroit.....	10, 12	42½x2½-54x3...	L	Gemmer..	56, 0	W, Royer...	151	36x4-36x7.....	4,900	60, 80	368
369	W, Sheldon, W21..	N	B	2, R	10, 9¼	E, E	P.....	½, ½	Sheldon....	10, 16	39x2½-52x3....	L	Ross.....	49, 0	W.....	154	36x4-36x4d.....	5,340	50, 70	369
370	I, Russel, T.....	Y	B	2, R	13, 16	C, E	P, Own.....	½, ½	Mather....	8, 14	44x2½-56x3....	L	Ross.....	.....	W, Prudden.	152	36x5-36x8.....	5,100	50, 70	370
371	I, Clark, 2D.....	....	.....	2, R	.....	E, C	P, Detroit.....	½, ½	Detroit.....	.....	.....	....	Jacox.....	.....	W.....	151	36x4-36x7.....	.....	.....	371
372	W, Sheldon.....	....	.....	2, R	.....	E, E	R, Own.....	....	Sheldon....	.....	.....	L	Lavine...	.....	W, Schwarz.	144	34x4-36x4d.....	.....	.....	372
373	W, Timken.....	....	.....	2, R	.....	E, E	.....	⅜, ⅜	.....	.....	.....	....	Ross.....	.....	W.....	150	36x4-36x8.....	.....	.....	373
374	W, Timken, 6560..	N	W	2, R	12½, 9¾	E, E	P, Detroit.....	½, ½	.....	.....	40x2½-54x3....	L	Ross.....	.....	W.....	158	36x4-36x4d.....	5,400	—, 85	374
375	W, Empire, O....	Y	B	2 R	11, 10	E, E	P, Parish.....	½, ½	Sheldon....	.....	42x2½-54x3....	L	Gemmer..	.....	W, Crane..	156	36x4-36x7.....	.....	.....	375
375a	W, Timken, 6560.	Y	W	2, R	12, 9½	E, E	P, Parish & B..	½, ½	Sheldon....	8, 12	44x2½-56x3....	L	Lavine...	52, 0	W, Bimel..	150	36x4-36x7.....	4,650	54, 78	375a
376	W, Sheldon.....	Y	W	2, R	11, 9¾	E, E	P, Own.....	½, ½	Detroit....	.....	.....	R	Ross.....	.....	S.....	144	36x4-36x7.....	4,500	.....	376
376a	W, Sheldon.....	Y	W	2, R	11, 9¾	E, E	P, Own.....	½, ½	Detroit....	.....	.....	R	Ross.....	.....	S.....	160	36x4-36x8.....	5,600	.....	376a
377	W, Wisc., 900C...	Y	B	2, R	.....	E, E	P.....	½, ½	Sheldon....	9, 12	40x2½-56x3....	L	Own.....	.....	I, Smith....	150	36x4-36x3.....	5,000	25, 75	377
378	W, Timken, 6560..	Y	B	2, R	12¼, 9¾	E, E	R, Own.....	½, ½	Perfection..	11, 12	40x2½-52x3....	L	Ross.....	.....	W.....	152	36x4-36x7.....	4,600	60, 80	378
379	I, Clark, 2D.....	Y	B	4, FR	12½, 12	C, E	R, Own.....	½, ½	Mather....	11, 15	40x2½-48x2½..	L	Lavine...	62, 0	I, Own.....	150	34x5-36x6.....	4,800	30, 60	379
380	W, Sheldon.....	....	.....	2, R	.....	E, E	P, Smith.....	....	.....	.....	.....	....	Lavine...	.....	W.....	156	36x4-36x6.....	.....	.....	380
381	W, Timken.....	....	.....	2, R	.....	E, E	P, Parish.....	....	Delaney....	.....	.....	L	Ross.....	.....	W, Archibald	144	36x3½-36x7.....	.....	.....	381
382	I, Own.....	....	.....	2, F	.....	C, E	R, Own.....	....	Spring Perch	.....	.....	R	Gemmer..	.....	W, Archibald	144	48x3½d-48x3½d.....	.....	.....	382
383	W, Timken.....	N	W	2, R	14, 12	C, E	P.....	½, ½	Higgins....	9, 15	40x2½-52x3½..	L	Lavine...	48, 0	W, Bimel...	144	36x5-36x8.....	4,200	30, 75	383
384	B, Own.....	....	.....	2, R	.....	C, C	.....	....	.....	.....	.....	....	Own.....	.....	.....	132	36x6-36x6.....	.....	.....	384
384a	W, Wisconsin.....	....	.....	2, R	.....	.....	.....	....	Own.....	.....	.....	....	Ross.....	.....	.....	136	36x5-36x8.....	4,750	.....	384a
385	W, Sheldon.....	....	.....	2, R	.....	E, E	R, Own.....	½, ½	Own.....	.....	.....	L	Ross.....	.....	I, Smith....	144	36x4-36x8.....	.....	.....	385
386	B, Own.....	Y	B	4, FR	9¹¹⁄₁₆, 9¹¹⁄₁₆	C, C	P, Parish & B..	½, ½P	Tuthill....	11, 10	45½x2½-44x2½..	R	Ross.....	51, 0	W, Schwarz.	124	36x6-36x6.....	6,400	38, 55	386
387	I, Clark, 2D.....	Y	B	2, R	10, 13½	C, E	P.....	½, ½	Detroit....	9, 14	40x2½-54x3....	L	Jacox.....	45, 0	S, Clark....	152¼	36x6p-42x9p.....	5,000	50, 75	387
388	W, Sheldon, W21..	Y	B	2, R	.....	E, C	P.....	½, ½	U. S.....	11, 13	40½x2½-50½x3..	L	Ross.....	39, 6	I, Smith....	.....	36x4-36x10.....	.....	50, 80	388
390	W, Own.....	N	S	2, R	10¼, 9½	C, E	R, Own.....	½, ½	.....	11, 12	42½x3-46x3....	L	Own.....	56, 0	I.....	156	36x5-36x5d.....	7,000	52, 72	390
391	W, Own.....	N	B	2, R	12, 9	C, E	P.....	½, ½	.....	9, 14	42x3-54x3.....	R	Ross.....	55, 0	S.....	150	36x5-36x5d.....	6,900	62, 75	391
392	W, Sheldon.....	....	.....	2, R	.....	.....	R, Own.....	½, ½	Sheldon....	.....	.....	L	Ross.....	.....	W, Hoopes..	158½	36x5-36x5d.....	4,800	—, 62	392
393	W, Sheldon.....	....	.....	2, R	.....	.....	R, Own.....	½, ½	Sheldon....	.....	.....	L	Ross.....	.....	W, Hoopes..	170	38x7p-42x9p.....	5,580	—, 61	393
393a	W, Sheldon.....	N	.....	2, R	.....	E, E	P.....	½, ½	Sheldon....	.....	.....	L	.....	.....	W, Bimel..	155	36x5-36x5d.....	.....	.....	393a
394	W, Sheldon, W21..	Y	W	2, R	10½, 9	E, E	P.....	½, ½	Sheldon....	10, 11	42x3-58x3½....	L	Gemmer..	46, 2	I, Smith....	175	36x5-36x5d.....	6,000	40, 70	394
395	I, Own.....	Y	W	2, R	14, 14	C, C	P.....	½, ½	Perfection..	.....	48x3-52x4.....	L	Ross.....	48, 0	S, Dayton..	168	38x7p-42x9p.....	6,000	50, 75	395
396	I, Own.....	N	BS	2, R	10½, 10½	C, E	R.....	½, ½	.....	.....	.....	L	Own.....	61, 0	S.....	174	36x5-40x5d.....	7,075	54, 70	396
397	W, Timken, 6652..	Y	W	2, R	11, 10	E, E	P, Savage.....	½, ½	Detroit....	11, 16	40x3-50x3½....	L	Ross.....	.....	I, Smith....	187	36x5-40x5d.....	6,600	—, 76	397
398	W, Timken, 6652..	N	B	2, R	8, 9½	E, E	P.....	½, ½	Detroit....	11, 14	42x3-54x3½....	L	Ross.....	58, 0	W, Bimel...	168	36x5-40x5d.....	6,600	56, 80	398
399	W, Timken.....	....	.....	2, R	.....	C, E	P, Parish.....	....	Tuthill....	.....	.....	L	Ross.....	.....	S, Clark....	166	36x6-36x10.....	.....	.....	399
400	W, Timken, 1631B	N	W	2, R	10, 9	E, E	.....	½, ½	Mather....	8, 13	48x3-60x3.....	L	Ross.....	58, 0	W, St. Marys	156	36x5-36x5d.....	7,200	60, 80	400
401	W, Timken, 6652..	Y	B	2, R	.....	E, E	P.....	½, ½	Spring Perch	11, 14	41½x3-56x3½..	R	Gemmer..	59, 10	W, Archibald	167½	36x5-40x5d.....	6,720	.....	401
402	W, Timken, 6652..	N	W	2, R	9, 10	E, E	R, Own.....	½, ½	Tuthill....	9, 12	42x3-54x3½....	L	Ross.....	.....	W, Schwarz.	176	36x5-40x5d.....	6,500	55, 75	402
403	I, Clark.....	N	B	2, R	11, 11	C, E	R.....	½, ½	Mather....	8, 12	44x3-56x3½....	L	Lavine...	64, 0	S, Clark....	160	36x5-40x5d.....	6,800	50, 80	403
404	I, Russel, UI300..	Y	B	2, R	12½, 14½	C, E	P, Detroit.....	½, ½	Mather....	10, 14	44x2½-56x3½..	L	Lavine...	55, 0	I, Smith...	164	36x5-40x5d.....	4,960	27, 90	404
405	W, Timken, 6652..	N	B	2, R	.....	E, E	P, Parish & B..	½, ½	Merrill....	12, 15	44x2½-52x3½..	L	Gemmer..	.....	I, Smith....	164	36x5-36x5d.....	6,430	60, 82	405
406	W, Timken, 6660..	Y	B	2, R	9½, 8½	E, E	R, Own.....	½, ½	Mather....	10, 15	40x2½-54x3....	L	Gemmer..	.....	W, Standard	168	36x5-36x10.....	6,850	60, 75	406
407	W, Timken, 6652..	N	B	2, R	14½, 10½	E, E	P, Parish & B..	½, ½	Perfection..	9, 13	44x3-54x3½....	L	Ross.....	65, 0	I, Smith....	190	36x5-40x10.....	7,000	60, 78	407
408	W, Own.....	Y	B	2, R	11½, 10½	E, E	R, Savage.....	½, ½	Perfection..	8, 15	44x3-56x3½....	L	Ross.....	60, 0	W, Prudden.	160	36x5-36x10.....	6,450	50, 80	408
409	W, Wisconsin.....	....	.....	2, R	.....	E, E	P, Savage.....	....	Iron City..	.....	.....	L	Ross.....	.....	W, Jones...	165	36x5-36x5d.....	.....	.....	409
410	I, Clark, 3.....	Y	B	2, R	13½, 11½	C, E	P, Detroit.....	½, ½	Detroit....	8, 18	42x3-54x3½....	L	Gemmer..	56, 8	I, Smith....	170	36x5-36x10.....	6,890	56, 78	410
411	W, Timken.....	Y	W	2, R	.....	E, E	P.....	½, ½	Mather....	8, 15	46x3-56x3.....	R	Gemmer..	.....	S.....	170	36x5-36x5d.....	7,250	50, 90	411
412	W, Timken, 6652..	Y	W	2, R	9½, 9	E, E	P, Smith:....	½, ½	Rowland...	9, 15	42x3-56x4.....	L	Ross.....	60, 0	I, Smith....	154	36x5-36x10.....	6,750	86, 70	412
413	I, Own.....	N	S	4, FR	15, 15	C, C	P, Parish & B..	½, ½	Tuthill....	6, 8	41½x3-41½x3....	L	Wohlrab..	60, 0	W, Prudden.	130	36x8-36x8.....	3,800	40, 60	413
414	W, Timken.....	....	.....	2, R	.....	.....	P.....	....	.....	.....	.....	....	.....	.....	.....	168	36x5-40x5d.....	.....	.....	414
415	W, Timken, 6652..	N	B	2, R	14½, 8⁵⁄₁₆	E, E	P, Own.....	½, ½	Mather....	7, 13	44x3-60x3½....	L	Ross.....	59, 8	W, Prudden.	172	36x5-36x5d.....	7,300	53, 69	415
416	W, Timken, 6652..	N	B	2, R	10, 8	E, E	P.....	½, ½	Mather....	8, 12	44x3-56x3½....	L	Gemmer..	48, 10	I, Smith....	156	36x5-36x5d.....	7,000	62, 75	416
417	W.....	N	B	2, R	.....	E, E	P.....	½, ½	.....	9, 14	48x3-56x3½....	L	Ross.....	.....	W.....	128	36x5-40x5d.....	7,235	.....	417
418	W.....	Y	B	2, R	.....	E, E	P.....	½, ½	.....	9, 17	42x3-56x3½....	L	Ross.....	58, 0	I.....	162	36x5-36x5d.....	7,550	.....	418
419	W, Timken, 6652..	Y	W	2, R	9, 10⅜	E, E	P.....	½, ½	Detroit....	10, 14	44x3-58x4....	L	Ross.....	46, 0	W, Prudden.	162	36x5-40x5d.....	7,000	50, 20	419
420	W, Sheldon, W30..	Y	B	2, R	10, 8½	E, E	R.....	½, ½	Sheldon....	9, 15	44x3-60x4....	R	Ross.....	.....	W, Wayne..	176	36x5-36x5d.....	6,000	40, 70	420
421	W, Timken, 6652..	N	B	2, R	12½, 10½	E, E	R, Own.....	½, ½	Detroit....	10, 12	44x3-54x4....	L	Jacox.....	55, 0	Own.....	163	36x5-40x5d.....	7,540	56, 75	421
422	W, Standard.....	Y	B	2, R	.....	E, E	P, Own.....	½, ½	Perfection..	.....	46x3-62x3½....	L	Ross.....	61, 0	I, Smith....	156	36x5-40x5d.....	6,900	76, 91½	422
423	W, Timken, 6652..	Y	W	2, R	9, 8	E, E	R.....	½, ½	Detroit....	12, 16	45x2½-54x3½....	L	Gemmer..	.....	I, Smith....	144	36x5-36x5.....	6,825	25, 80	423
424	W, Sheldon.....	....	.....	2, R	.....	E, E	R, Own.....	....	Sheldon....	.....	.....	L	Ross.....	.....	W, Schwarz.	160	36x5-36x5d.....	.....	.....	424
425	W, Timken.....	....	.....	2, R	.....	.....	.....	½, ½	Tuthill....	.....	.....	....	Ross.....	.....	W.....	160	36x5-36x5d.....	.....	.....	425
426	W, Hindley.....	....	.....	2, R	.....	E, C.	P, Savage.....	½, ½	Perfection..	.....	.....	....	Ross.....	.....	W, Wayne..	156	36x5-36x5d.....	.....	.....	426
427	W, Sheldon, W31..	N	B	2, R	11¼, 8¼	E, E	R.....	½, ½	Sheldon....	9, 14	40x3-50x3½....	L	Wohlrab..	54, 0	I, Smith....	160	36x5-36x5d.....	7,150	66, 75	427
428	I, Own.....	....	B	2, R	.....	E, E	P.....	½, ½	.....	10, 14	42½x3-57½x4....	L	Own.....	.....	W.....	162	36x5-40x10.....	7,500	50, 68	428
429	B, Own.....	....	.....	4, FR	.....	E, C	P, Castle.....	....	Spring Perch	.....	.....	R	Ross.....	.....	W, Standard	150	36x7-36x7.....	.....	.....	429
430	I, Clark, 3D.....	Y	B	2, R	11½, 12	C, E	P.....	½, ½	Perfection..	11, 13	46x3-62x3½....	L	Jacox.....	62, 6	S, Clark....	165	36x5-36x10.....	6,400	50, 75	430
431	W, Sheldon, W30..	N	W	2, R	10, 9½	E, E	R.....	½, ½	Sheldon....	9, 13	42x2½-56x3½....	L	Ross.....	36, 0	I, Smith....	160	36x5-36x5d.....	7,300	—, 80	431
432	C, Own.....	N	B	2, R	11½, 15½	E, E	P.....	½, ½	Perfection..	11, 15	46½x3-54x3....	L	Gemmer..	56, 0	W.....	150	36x5-36x5d.....	9,285	50, 90	432

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7,000 (Kelly-Springfield—10,000 (Denby) INTERNAL-COMBUSTION

Line no.	Brand name and model name or number	Price f. o. b. factory with seat and tires but without body.	Make of engine and model number.	Number of cylinders.	Bore and stroke, and N. A. C. C. horse-power.	Lubrication (Forced-feed, Splash).	Make of governor (None).	Water-circulation (Pump, Thermo-siphon).	Radiator (Cellular, Tubular) and make.	Radiator guard included in price? (Yes or No)	Make of carbureter.	Fuels (Distillate, Gasolene, Kerosene).	Ignition (Battery, Magneto) and make of magneto.	Electric starting and lighting included in price? (Yes or No)	Clutch (Cone, Multiple-disk, Plate) and make.	Transmission (Individual-clutch, Planetary, Sliding-gear) and number of forward speeds.	Make of transmission and model number.	Power take-off included in price? (Yes or No)	Make of universal joints.	Line no.
	7,000 Pounds—Con.																			
433	Kelly-Sp'gf'ld, K41 (int.)	.....	Own	4	4½x6½-32.4	F	Pierce	P	C. Long	N	Zenith	G	M. Eisemann	N	P. Borg & B	S. 4	Covert, SA4	N	Spicer	433
434	Kelly-Sp'gf'ld, K42 (w'm)	.....	Own	4	4½x6½-32.4	F	Pierce	P	C. Long	N	Zenith	G	M. Eisemann	N	P. Borg & B	S. 4	Covert, SA4	N	Spicer	434
435	Kissel, Heavy Duty	4 47:	Own	4	4½x5½-28.9	S	Pierce	P	T. Fedders	N	Stromberg	G	M. Eisemann	N	M. Warner	S. 4	Warner, T53	N	Spicer	435
436	Kleiber, C	4,400	Continental, E4	4	4½x5½-32.4	S	Pierce	P	T. R'e-T'r'y	N	Stromberg	G	M. Bosch	N	M. Hele-Shaw	S. 4	Brown-L, 60-4	N	Spicer	436
437	K-Z	4,200	Continental, E4	4	4½x5½-32.4	S	Pierce	P	T. Chicago	Y	Stromberg	G	M. Bosch	N	M. Brown-L	S. 4	Brown-L, 50	N	Thermoid	437
438	Larrabee, SL	.....	Continental, E4	4	4½x5½-32.4	S	Simplex	P	T. Bush	N	Schebler	G	M. Bosch	N	M. Brown-L	S. 4	Brown-L, 50	N	Spicer	438
439	Maccar, M-2	4,500	Wisc., VAU	4	4½x6-32.4	F	Pierce	P	T. Own	N	Stromberg	G	M. Eisemann	N	M. Brown-L, 50	S. 4	Brown-L, 50	N	Spicer	439
440	Mack, AC	4,950	Own	5	5x6-40.0	S	Own	P	T. Own	N	Zenith	G	M. Acro	N	P. Own	S. 3	Own	Y	Spicer	440
441	Mapleleaf, CC	.....	Hinkley, HA200	4	4½x5½-32.4	FS	Hinkley	P	T. McCord	Y	Stromberg	G	M. Bosch	N	M. Fuller	S. 4	Fuller, GU5	N	Blood	441
441a	Master, E (int)	4,640	Buda, YTU	4	4½x6-32.4	F	Pierce	P	T. Own	N	Master	G	M. Eisemann	N	M. Brown-L	S. 4	Brown-L, 50	Y	Spicer	441a
442	Master, A, (worm)	4,190	Buda, YTU	4	4½x6-32.4	F	Pierce	P	T. Own	N	Master	G	M. Eisemann	N	M. Brown-L	S. 4	Brown-L, 50	Y	Spicer	442
443	Menominee G	.....	Continental, E4	4	4½x5½-32.4	S		P	T. Own	N	Stromberg	G	M. Eisemann	N	P. Borg & B	S. 4	Brown-L, 50	N	Spicer	443
444	National, IA	.....	Waukesha, NU4R	4	4½x5½-32.4	S	Waukesha	P	C. McKinnon	Y	Zenith	G	M. Eisemann	N	M. Hele-Shaw	S. 4	Brown-L, 50	N	Spicer	444
445	Nelson & LeMoon, F3½	.....	Continental, E4	4	4½x5½-32.4	FS	Pierce	P	T. Chicago		Stromberg		M. Bosch		M. Brown-Lipe	S. 4	Brown-L, 50		Thermoid	445
446	Noble, E70	.....	Buda, YTU	4	4½x6-32.4	F	Pierce	P	T. Chicago		Stromberg		M. Eisemann		M. Fuller	S. 4	Fuller, G5			446
447	Northway, B3	4,250	Own	4	4x6-25.6	FS	Pierce	P	C. G & O	Y	Schebler	G	B	Y	M. Fuller	S. 4	Fuller, GU5	N	Spicer	447
447a	O. K., M	4 150	Buda, YTU	4	4½x6-32.4	F	Pierce	P	T. R'me-T'r'y		Zenith		M. Eisemann		M. Fuller	S. 4	Fuller, H			447a
448	Old Reliable, C	4,000	Wisconsin, UU	4	4½x6-28.9	F	Monarch	P	T. Chicago	Y	Stromberg	G	M. Bosch	N	M. Fuller	S. 4	Fuller, G	Y	Spicer	448
449	Paige, 51-18	.....					Pierce	P	T	Y	Stromberg	G	M. Bosch	N	M. Brown-L	S. 4	Brown-L	N	Spicer	449
450	Parker, J20	4,400	Wisconsin, VAU	4	4½x6-32.4	F	Monarch	P	T. Bremer	Y	Stromberg	G	M. Bosch	Y	M. Brown-L	S. 4	Warner, T53	N	Kinsler-B	450
451	Republic, 20	.....	Continental, E4	4	4½x5½-28.9	FS	Pharo	P	T. Own	N	Stromberg	G	M.		M. Fuller	S. 4	Fuller, GU5	N	Hartford	451
452	Reynolds, 7A	4,500	Own	4	4½x5½-32.4	F	Hinkley	P	T. Own	Y	Stromberg	dgk	M. Bosch	Y	M. Own	S. 4	Own		Thermoid	452
453	Royal	4,200	Wisconsin	4	4½x6-32.4		Monarch	P	T. Kells		Stromberg		M. Bosch		P. Borg & B	I. 3	Own			453
454	Sandow, M	3,995	Continental, E4	4	4½x5½-32.4	S	Monarch	P	T. Chicago	Y	Stromberg	G	M. Bosch	N	M. Brown-L	S. 4	Brown-L, 50	N	Spicer	454
455	Sanford, W35	4,050	Continental, E4	4	4½x5½-32.4	F	Pierce	P	T. Long	N	Stromberg	G	M. Bosch	N	P. Borg & B	S. 4	Brown-L, 50	N	Spicer	455
456	Schacht	.....	Buda, YTU	4	4½x6-32.4	F	Duplex	P	T. Own	N	Schebler	G	M. Bosch	N	C. Own	S. 8	Own	N	M & E	456
457	Selden, 3½A	.....	Continental, E7	4	4½x5½-32.4	S	Pierce	P	T. Long	Y	Stromberg	G	M. Eisemann	N	M. Brown-L	S. 4	Brown-L, 50	N	Spicer	457
458	Service, 71	4,285	Buda, HU	4	4½x5½-28.9	F	Simplex	P	T. Long	N	Stromberg	G	M. Eisemann	N	P. Borg & B	S. 4	Brown-L, 60	N	Spicer	458
459	Service, 76	4,485	Buda, YU	4	4½x6-32.4	F	Simplex	P	T. Long	N	Stromberg	G	M. Eisemann	N	P. Borg & B	S. 4	Brown-L, 60	N	Spicer	459
460	Signal, M	4,275	Continental, E4	4	4½x5½-32.4	FS	Pierce	P	T. McCord	Y	Stromberg	G	M. Eisemann	N	M. Brown-L	S. 4	Brown-L, 50	N	Spicer	460
461	Standard, 66	.....	Continental, E7	4	4½x5½-32.4	FS	Monarch	P	T. Long	Y	Stromberg	G	M. Eisemann	N	M. Brown-L	S. 4	Brown-L, 50	N	Spicer	461
462	Sterling	4,550	Own	4	4½x6½-32.4	F	Waukesha	P	C. Own	Y	Rayfield	G	M. Eisemann		M. M & E	I. 3	Own	N	Spicer	462
463	Stewart, 10	3,895	Continental, E7	4	4½x5½-32.4	FS	Pierce	P	T. Bush	N	Zenith	G	M. Eisemann	N	M. Fuller	S. 4	Fuller, GU4	Y	Hartford	463
464	Sullivan, H	4,650	Buda, YTU	4	4½x6-32.4	F	Pierce	P	T. Bush	Y	Stromberg	G	M. Bosch		M. Brown-L	S. 4	Brown-L, 50	N	Spicer	464
465	Super, 70	.....	Wisconsin, UAU	4	4½x6-28.9	F	Simplex	P	T. Chicago	Y	Zenith	G	M. Bosch	N	M. Fuller	S. 4	Fuller, G	Y	Spicer	465
466	Tiffin, PW	4,175	Continental, E4	4	4½x5½-32.4	FS	Pierce	P	T. Own	Y	Schebler	G	M. Eisemann	N	P. Borg & B	S. 4	Fuller, G	Y	Peters	466
467	Titan	4,400	Buda, YTU	4	4½x6-32.4	F	Simplex	P	T. B & W	N	Stromberg	G	M. Eisemann	N	P. Borg & B	I. 4	Cotta, R	N	M & E	467
468	Tower, G	4,335	Continental, E4	4	4½x5½-32.4	S	Pierce	P	T. Own	N		G	M.	N	M. Fuller	S. 4	Fuller, G	N		468
469	Twin City	4,750	Wisconsin, JAU	4	5½x6-42.0	F	Pierce	P	C.		Stromberg		K-W		M. Hele-Shaw	I. 3	Cotta			469
470	United, C		Buda, HU	4	4½x5½-28.9	F	Simplex	P	T, G & O		Stromberg		M. Bosch		M. Brown-L	S. 4	Brown-L, 35			470
471	Universal, L		Buda	4	4½x5½-28.9		Monarch	P	T. Long		Zenith		M. Eisemann		M. Own	S. 3	Own			471
472	U. S., J	3,950	Continental, E4	4	4½x5½-32.4	FS	Pierce	P	T. Long		Stromberg		M. Eisemann		C. Hartford	S. 4	Brown-L, 60			472
473	Victor, M	3,800	Continental, E4	4	4½x5½-32.4	FS		P	Own		Stromberg		M. Bosch		M. Brown-L	S. 4	Brown-Lipe			473
474	Walter, (Wis.), MO3	.....	Own	4	4½x6-30.6	FS	Own	P	T. Own		Zenith		M. Swiss		C. Own	S. 4	Own			474
475	Ward LaFrance, 4A	4,490		4	4½x6½-32.4	F		P	T. Own	Y	Zenith	G	M. Bosch	N	M. Brown-L	S. 4	Brown-L, 60	N	Spicer	475
476	Watson, 18	.....	Continental, E4	4	4½x5½-32.4	S	Pierce	P	T. R'e-T'r'n'y	N	Stromberg	G	M. Simms	N	M. Brown-L	S. 4	Brown-L, 50	N	Spicer	476
477	Wichita, O	4,000	Beaver, JB	4	4½x6-28.9	F	Duplex	P	C. E & M	Y	Stromberg	G	M.	N	M.	I. 4	Cotta	N	Thermoid	477
478	Wilcox, D		Own	4	4½x5-28.9	S	Pierce	P	T. Long	N	Stromberg	G	M. Bosch	N	C. Own	S. 4	Own	N		478
479	Wilson	3,950	Continental, E7	4	4½x5½-32.4	FS	Pierce	P	T. Own	N	Marvel	G	M. Eisemann	N	M. Brown-L	S. 4	Brown-L, 60	N	Hartford	479
480	Winther, 70	4,200	Wisconsin, TAU	4	4x6-25.6	F	N	P	T. Bremer	N	Master	G	M. Eisemann	N	P. Borg & B	S. 4	Brown-L, 50	N	Blood	480
	8,000 Pounds:																			
481	Bessemer, K2	4,285	Continental, E7	4	4½x5½-32.4	S	Pierce	P	C. Standard	Y	Rayfield	G	M. Bosch	N	P. Borg & B	S. 4	Brown-L, 60	N	Spicer	481
482	Gabriel, F	4,300	Buda, YU	4	4½x6-32.4	F	Duplex	P	T. G & O		Rayfield		M. Bosch		P. Borg & B	S. 4	Brown-L, 60			482
483	Highway-Knight, A	.....	Moline-K., W	4	4x6-25.6	F		P	T. Own	N	Zenith	G	M. Eisemann	N	M. Brown-L	S. 4	Own	N	Thermoid	483
484	Jumbo, 40		Buda, YTU	4	4½x6-32.4	F	Duplex	P	T. Own	Y	Zenith	G	M. Eisemann	N	M. Brown-L	S. 4	Brown-L, 50	Y	Spicer	484
485	Kimball, E	4,975	Wisconsin, JU	4	5 1-10x5½-42.0	FS	Duplex	P	C. Flexo	N	Zenith	D	M. Berling	N	M. Brown-L	S. 4	Brown-L, 60	N	Spicer	485
486	Moreland, 19G	4,875	Cont'l, Class B	4	4½x6-36.0	F	Cont'l	P	T. Own	N	Master	D	M. Dixie	N	M. Own	S. 4	Own	N	Thermoid	486
487	Noble, MW4	3,750	Continental	4	4½x5½-32.4	FS	Pierce	P	T. Chicago		Stromberg		M. Eisemann		P. Borg & B	S. 4	Fuller			487
488	Packard, 4E	4,550	Own	4	4½x5½-32.4	F	Own	P	T. Fedders	N	Own	G	M. Dixie	N	M. Own	S. 4	Own	N	Ther-Sp	488
489	Riker, BB		Own	4	4½x6-28.9	S	Own	P	T	N	Ball & Ball	G	M. Berling	N	C. Own	S. 4	Own	N	Own	489
489a	Rowe, HW	4,350	Wisconsin	4	4½x6-32.4	F	Simplex	P	Fedders		Zenith		M. Bosch			S. 4	Brown-L		Spicer	489a
490	Union, H	3,975	Wisconsin, VAU	4	4½x6-32.4	F	Duplex	P	T. Own	N	Schebler	G	M. Eisemann	N	M. Fuller	S. 4	Fuller, GU	N	Universal	490
	10,000 Pounds:																			
491	Acason, M	5,850	Waukesha, EU	4	5x6½-40.0	F	Waukesha	P	C. National	Y	Stromberg	G	M. Eisemann	N	M. Detlaff, H8	I. 4	Cotta, 8	Y	Blood	491
491a	Acme, E	5,150	Continental, B2	4	4½x6-36.1	F	Cont'l	P	T. G & O	N	Rayfield	G	M. Eisemann	N	P. Borg & B	I. 4	Cotta, T	N	Blood	491a
491b	Atterbury, 8E	5,575	Continental, B2	4	4½x6-36.1	FS	Cont'l	P	T. Own	Y	Zenith	G	B. M	Y	M. Brown-L	S. 4	Brown-L, 60	N	Spicer	491b
492	Autohorse, 10	2,000	Continental	4	3½x5-22.5		N	P	C. Eureka		Stromberg		M. Eisemann	N	P. Borg & B	S. 3	Detroit			492
493	Available, H5	5,575	Continental, B2	4	4½x6-36.1	FS	Cont'l	P	T. Chicago	Y	Stromberg	G	M. Bosch	N	M. Brown-L	S. 4	Brown-L, 60	N	Spicer-Bld	493
494	A & B, 5T		Own	4	5½x3½-42.8		N	P	T. Bush		Schebler		M. Bosch		M. Brown-L	S. 4	Brown-Lipe			494
495	Bollstrom, A		Own	4	4½x5½-28.9			P	Own		Stromberg		M. Bosch		M.	I. 4	Own		Own	495
496	Brockway, T	5,000	Continental, B2	4	4½x6-36.1	F	Cont'l	P	T. G & O	Y	Stromberg	G	M. Eisemann	N	M. Brown-L	S. 4	Brown-L, 60	N	Spicer	496
497	Clydesdale, 120B	5,500	Continental, B2	4	4½x6-36.1	F	Own	P	T. Own	Y	Stromberg	G	M. Eisemann	N	M. Brown-L	S. 4	Brown-L, 60	N	Spicer	497
498	Couple-Gear, AC	6,700	Wisconsin	4	5½x7-44.1	FS	N	P	C. Ideal	Y	Stromberg	G	BM. E'sm'nn	N	†	†, 6	Own		Own	498
499	Day-Elder, E	4,500	Buda	4	4½x6-32.4		Monarch	P	T. Bush		Zenith		M. Berling		M. Brown-L	S. 4	Brown-Lipe		Hartford	499
500	Denby, 210	4,900	Continental, E7	4	4½x5½-32.4	F	Monarch	P	T. Long	Y	Stromberg	G	M. Eisemann	N	M. Own	S. 4	Warner, T53	N	Peters	500

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TRUCK SPECIFICATIONS

7,000 (Kelly-Springfield)—10,000 (Denby)

Line no.	Final drive (Bevel, Chain, Internal-gear, Spur-and-bevel, Worm) and make of rear axle and model number.	Hotchkiss drive? (Yes or No)	Differential (Bevel, Spur, Worm) and make.	Number and location of driving-wheels (Front, Rear).	Clearance under front and rear axles.	Service and emergency brakes (Contracting, Expanding).	Frame material (Pressed-steel, Rolled-steel) and make.	Front and rear springs (Cantaliver; 1-2, 3-4, or Full elliptic; Transverse).	Make of springs.	Leaves in front and rear springs.	Length and width of front and rear springs.	Driver's position (Left, Right).	Make of steering gear.	Turning-circle diameter (feet and inches).	Wheels (Iron, Steel, Wood) and make.	Wheel-base (standard).	Front and rear tire sizes (dual, pneumatic).	Weight of chassis (pounds).	Perc. of weight on rear axle when empty & when loaded.	Line no.
433	I, Clark	N	B	2, R	9½, 13½	E, E	P	½, ½	Perfection	11, 14	48x3-56x4	L	Gemmer	56, 6	S	156	36x5-40x5d	8,500	50, 90	433
434	W, Standard	N	B	2, R	9½, 11	E, E	P	½, ½	Perfection	11, 14	48x3-56x4	L	Gemmer	56, 0	S	156	36x5-40x5d	8,500	50, 90	434
435	W, Sheldon, W30	Y	W	2, R	10½, 8½	E, E	P, Smith	½, ½	Mather	11, 12	44x3-62x3½	L	Ross	50, 0	I, Smith	168	36x5-36x5d	7,200	57½, 74½	435
436	W, Timken, 6652	Y	W	2, R	9½, 10	E, E	R, Own	½, ½	Betts	8, 14	44x3-62x3	R	Ross		W, W't'rh'se	163	36x5-36x10	7,200	50, 75	436
437	W, Timken, 6652	N	B	2, R	12½, 10½	E, E	R, Own	½, ½	Tuthill	8, 12	42x3-52x3½	L	Lavine	66, 4	S. Standard	156	36x5-40x5d	6,500		437
438	W, Sheldon, W30	Y	B	2, R	14, 9	E, E	P, Parish & B	½, ½	Merrill	10, 15	44x3-56x3½	L	Ross		W, Hoopes	160	36x5-36x5d	6,850	44, 88	438
439	W, Timken, 6652	N	B	2, R	9 5/16, 8½	E, E	P, Parish	½, ½	Merrill	9, 14	42x2½-56x3½	L	Ross		S. Dayton	174	36x5-36x6d	6,175	—, 70	439
440	C, Own	N	B	2, R	11½, 10½	C, E	P, Own	½, ½	Merrill	9, 10	46x3½-52x4	L	Own	52, 6	W, Own	Opt.	36x5-36x5d	8,070	46, 66	440
441	W, Sheldon, W31	Y	B	2, R	10, 8½	E, E	R	½, ½	Sheldon	–, 15	46x3-56x4	L	Ross		W, Hayes	160	36x5-36x5d	7,000	50, 70	441
441a	I, Walker	Y	BS	2, R		C, E	P, Parish & B	½, ½	Detroit	12, 15	44x3-58x4	L	Ross	48, 0	S	158	36x5-40x5d	7,000	58, 72	441a
442	W, Timken, 6652	Y	B	2, R	11½, 10½	E, E	P, Parish & B	½, ½	Detroit	12, 15	44x3-58x4	L	Ross	48, 0	S	158	36x5-40x5d	7,000	58, 72	442
443	W, Timken, 6652	N	B	2, R		E, E	R, Own	½, ½	Tuthill	11, 11	44x2½-54x3½	L	Ross		W, Standard	160	36x5-36x5d	6,650		443
444	W, Timken, 6560	N	W	2, R	9½, 10½	E, E	R	½, ½	Mather	9, 17	46x3-58x3½	L	Ross	54, 0	W, Hayes	158	36x5-40x5d	7,000		444
445	W, Timken, 6652	Y		2, R		E, E	R, Own	½, ½	Tuthill				Lavine		W, Prudden		36x5-36x5d			445
446	W, Sheldon, W30			2, R		E, E	P, Parish & B	½, ½	Tuthill				Lavine		W, Bimel	166	36x5-36x5d			446
447	W, Sheldon, W30	Y	B	2, R	10, 10½	E, E	P	½, ½	Perfection	10, 12	44x3-56x4	L	Ross	50, 0	S, Clark	160	36x5-40x5d	7,300	51½, 73	447
447a	W, Wisc., 900			2, R		E, E	P, Hydraulic	½, ½	Liggett				Ross		W, Bimel	154	36x5-36x5d			447a
448	W, Sheldon, W30	Y	W	2, R	11½, 8½	E, E	R	½, ½	Sheldon	10, 16	48x3-60x4	R	Ross		W, St. Marys	160	36x5-36x5d	6,850	—, 77	448
449	W, Timken	N	B	2, R		E, E	P	½, ½	Perfection		46x3-58x4	L	Jacox		S, Dayton	160	36x5-36x5d	7,000	60, 40	449
450	W, Own	N	B	2, R	14, 11	C, E	P, Smith	½, ½	Tuthill	8, 16	51x3-60x3	L	Ross	64, 0	W, Bimel	160	36x5-40x5d	6,300	55, 76½	450
451	I, Torbensen, E1	Y	W, Powrlok	2, R		E, E	P, Detroit	½, ½	Mather	8, 13	44½x3-52½x4	L	Jacox		I, Smith	165	36x5-36x10	6,400		451
452	W, Own	Y	B	2, R	9½, 9½	E, E	R, Standard	½, ½	Own		44x3-56x3½	L	Own		I, Smith	156	36x5-36x5			452
453	W, Timken			2, R		E, E	R, Own	½, ½	Merrill				Ross		W	158	36x5-38x5d			453
454	W, Timken, 6652	N	W	2, R	8½, 8½	E, E	P, Savage	½, ½	Garden City	9, 17	44x3-56x3½	R	Ross	40, 0	W, Standard	175	36x5 36x5d	6,650	20, 70	454
455	W, Sheldon, W30	Y	B	2, R	10½, 8½	E, E	P	½, ½	Perfection	9, 13	46x3-54x3½	L	Ross	50, 0	W, Hoopes	174	36x5-36x5d	6,900	76, 87	455
456	W, Own	N	B	2, R	10½, 9	C, E	R, Own	½, ½	National	9, 15	35x2½-50x3	L	Own		W, St. Marys	168	36x5-36x5d	6,500	80, 80	456
457	W, Timken, 6652	N	B	2, R	9½, 8 15/16	E, E	P, Parish & B	½, ½	Perfection	10, 14	42x3-56x3½	R	Gemmer	62, 0	W	162	36x5-36x10	7,200	56, 78	457
458	W, Timken, 6652	N	B	2, R	9½, 7½	E, E	P, Own	½, ½	Mather	11, 13	46x3-60x3½	L	Ross	52, 0	S	171	36x5-36x5d	6,950	—, 72	458
459	W, Timken, 6652	N	B	2, R	9½, 7½	E, E	P, Own	½, ½	Mather	11, 13	46x3-60x3½	L	Ross	52, 0	S	171	36x5-36x5d	7,280	—, 72	459
460	W, Timken, 6652	N	B	2, R	11, 11	E, E	P, Savage	½, ½	Detroit	11, 16	44x3-56x3½	L	Ross	61, 0	W, Hayes	168	36x5-40x10	7,070	—, 84	460
461	W, Timken, 6660	N	B	2, R	9½, 8½	E, E	P, Parish & B	½, ½	Perfection	10, 15	45½x3-52½x3½	L	Gemmer		W	160	36x5-36x5d	6,480	57, 70	461
462	W, Timken, 6652	N	W	2, R	11½, 10½	E, E	P, W	½c, ½c	Mather	8, 10	48x3-60x3½	L	Ross	53, 6	W, Prudden	162	36x5-40x5d	8,300	53, 92	462
463	I, Clark, 3D	Y	B	2, R	10, 10	C, C	P, Hydraulic	½, ½	Detroit	10, 14	41x2½-54x4	L	Ross	52, 0	S, Clark	165	36x5-36x5d	6,080	64½, 80½	463
464	W, Timken, 6652	N	B	2, R	9½, 8½	E, E	P	½, ½	Sheldon	9, 13	46x3-56x3½	L	Ross	58, 6	W, Wayne	170	36x5-36x5d	6,000	50, 68	464
465	W, Sheldon, W30	Y	B	2, R	12, 12½	E, E	P	½, ½	Sheldon	10, 11	44x3-58x4	L	Ross	50, 0	S	164	36x5-40x5d	7,300		465
466	W, Sheldon, W31	N	B	2, R	10, 9	E, E	R	½, ½	Kalamazoo	9, 16	42x3-52x3½	L	Ross	62, 0	I, Smith	160	36x5-40x5d	6,950	40, 60	466
467	I, Clark, 3	N	B	2, R	12, 16	E, C	P, Parish & B	½, ½	Sheldon	9, 11	48x3-60x3½	L	Lavine	50, 0	S, Dayton	156	36x5-40x5d	7,350	57, 80	467
468	W, Timken	N	B	2, R	10½, 10½	E, E	P	½, ½	Detroit		44x3-56x3½	L	Ross		W	165	36x5-36x5d	6,800	—, 70	468
469	I			4, FR				½, ½					Ross			140	36x6-36x6			469
470	I, Clark, 3D			2, R		E, C	P, Detroit	½, ½	Detroit				Lavine		S	157	36x5-36x5d			470
471	C, Own			2, R		E, E	R	½, ½	Kalamazoo				Lavine		W	156	36x5-36x5d			471
472	W, Sheldon, W30			2, R		E, E	R, Own	½, ½	Sheldon				Lavine		W, Schwars	162	36x5-40x5d			472
473	W, Timken			2, R				½, ½					Gemmer			176	36x6-36x5d			473
474	E, Own			4, FR		C, C	R, Own	½, ½					Own		S, Own	108	40x4d-40x4d			474
475	W, Timken, 6652	N	W	2, R	10½, 8 5/16	E, E	P, Detroit	½, ½			46x3-60x3½	L	Ross		I, Smith	162	36x5-36x5d	7,750	—, 85	475
476	W, Empire, 12	Y	B	2, R	12½, 6½	E, E	P, Parish	½, ½	Sheldon	11, 12	44x3-56x3½	L	Gemmer		W, Crane	168	36x5-36x10	6,950		476
477	W, Sheldon, W30	Y	W	2, R	10, 8½	E, E	P, Own	½, ½	Detroit			R	Ross		S	165	36x5-36x5d	7,200		477
478	W, Sheldon, W30	Y	B	2, R		E, E	P	½, ½	Own	10, 12	40x2½-60x4	L	Own		I, Smith	154	36x5-36x5d	6,400	25, 75	478
479	W, Timken, 6652	Y	B	2, R	9½, 8½	E, E	R, Own	½, ½	Perfection	11, 17	46x3-60x3½	L	Ross		W	160	36x5-36x5d	6,800	60, 80	479
480	I, Clark, 3D	Y	B	2, R	11½, 12	C, E	R, Own	½, ½	Mather	8, 10	46x3-56x4	R	Ross	62, 0	S, Clark	150	36x5-36x5d	6,400	45, 80	480
481	I, Torbensen, E	N	B	2, R	11. 11	E, C	P	½, ½	Perfection	10, 12	44x3-56x3½	L	Ross		W, Schwars	175	36x5-36x10	6,700	54, 69	481
482	W, Timken, 6652			2, R		E, E	P, Parish	½, ½	Merrill				Gemmer		I, Smith	180	36x5-40x5d			482
483	W	Y		2, R	11, 10	E, E	P	½, ½	Sheldon		46x3-56x3½	L			W, Schwars	159	36x5-36x6d	7,200		493
484	I, Clark, 3D	Y	B	2, R	13½, 16½	C, E	P	½, ½	Perfection	10, 13	46x3-62x3½	L	Jacox	62, 6	S, Clark	165	38x7p-44x10p	6,800	50, 75	484
485	W, Sheldon, W30	Y	B	2, R		E, E	P	½, ½	U. S	12, 16	45½x3-53½x3½	L	Ross	39, 6	I, Smith		36x5-40x10		50, 80	485
486	W, Timken, 6652	N	W	2, R	9½, 11½	E, E	P	½, ½	U. S	9, 12	50x3-50x4	L	Ross		I, Smith	162	36x5-40x5	7,800	55, 67	486
487	W, Sheldon			2, R		E, E	R	½, ½	Kalamazoo				Lavine		S	168	36x5-36x5d			487
488	W, Own	N	S	2, R	10½, 10½	C, E	R, Own	½, ½		11, 14	42½x3-46x3	L	Own	56, 0	W	156	36x5-40x5d	7,460	55, 75	488
489	W, Own	N	B	2, R	12, 9	C, E	P	½, ½		9, 17	42x3-54x3	R	Ross	55, 0	S	150	36x5-36x6d	7,200	63, 77	489
489a	W, Sheldon			2, R		E, E		½, ½	Sheldon				Ross		W, Hoopes	156	36x5-36x6d	6,370	—, 75	489a
490	I, Torbensen, E	Y	B	2, R	13, 12	C, C	P, Own	½, ½	Mather	8, 15	42x3-56x4	L	Ross		S, Dayton	171	36x6-36x10		50, 70	490
491	W, Timken, 6752	Y	W	2, R	11, 10	E, E	P, Savage	½, ½	Detroit	12, 18	40x3-50x4	L	Ross		I, Smith	187	36x6-40x6d	8,350	—, 77	491
491a	W, Timken, 6760	N	B	2, R	9, 9½	E, E	P	½, ½	Detroit	11, 17	44x3-56x4	L	Ross	58, 0	I, Smith	180	36x6-40x6d	8,800	57, 80	491a
491b	W, Timken, 6752	N	B	2, R		E, E	P	½, ½	Spring Perch	10, 12	41½x3-54x4	L	Gemmer	59, 10	S, Dayton	167½	36x5-40x6	9,350		491b
492	I, Own			1, F		C, E	R, Own		Champion				Own		W, Bimel	43	34x10			492
493	W, Timken, 6752	N	W	2, R	9, 10	E, E	R, Own	½, ½	Tuthill	9, 15	44x3-60x4	L	Ross		I, Smith	190	36x6-40x12	9,500	55, 75	493
494	I, Own			2, R		C, C	R, Own	½, ½	Perfection				Gemmer		W	144	48x3½d-48x5d			494
495	I, Own			2, R		C, C	R, Own					L	Gemmer		S, Clark	144	36x6-36x6			495
496	W, Timken, 6752	N	B	2, R		E, E	P, Parish & B	½, ½	Merrill	12, 17	44x3-58x4	L	Gemmer		I, Smith	174	36x6-40x6d	9,075	60, 90	496
497	W, Timken, 6752	N	B	2, R	13½, 9½	E, E	P, Parish & B	½, ½	Perfection	11, 18	44x3-56x4	L	Ross		I, Smith	204	36x6-40x12	9,100	65, 76	497
498	B, Own	N		4, FR	11, 11	E, E	R	½, ½	Tuthill	12, 12	43x3-43x3	R	Own	36, 0	S, Own	144	36x5-36x5	11,000	50, 50	498
499	W, Sheldon			2, R		E, E	P, Savage		Iron City			L	Ross		W, Jones	150	36x5-40x6d			499
500	I, Clark, W100	Y	B	2, R	13½, 13½	E, E	P, Detroit	½, ½	Detroit	10, 18	42x3-54x4	L	Gemmer	62, 0	S, Russell	170	36x6-40x12	8,590	58, 80	500

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10,000—15,000 INTERNAL-COMBUSTION

Line no.	Brand name and model name or number	Price f. o. b. factory with seat and tires but without body.	Make of engine and model number.	Number of cylinders.	Bore and stroke, and N. A. C. C. horse-power.	Lubrication (Forced-feed, Splash).	Make of gov-ernor (None).	Water-circulation (Pump, Thermo-siphon).	Radiator (Cellular, Tubular) and make.	Radiator guard included in price? (Yes or No)	Make of carbu-reter.	Fuels (Distillate, Gasolene, Kerosene).	Ignition (Battery, Magneto) and make of magneto.	Electric starting and lighting included in price? (Yes or No)	Clutch (Cone, Multiple-disk, Plate) and make.	Transmission (Individual-clutch, Planetary, Sliding-gear) and number of forward speeds.	Make of transmission and model number.	Power take-off included in price? (Yes or No)	Make of univer-sal joints.	Line no.
	10,000 Pounds—Con.																			
501	Diamond T, S.	5,900	Class B, U. S.	4	4¼x6-36.1	FS	Pierce	P	T, G & O.	N	Stromberg.	G	M, Bosch	N	M, Brown-L.	S, 4	Brown-Lipe		Spicer	501
501a	Diamond T, EL.	5,675		4	4¼x5½-32.4	FS		P	T, G & O.	N	Stromberg.	G	M, Bosch	N	M.	S, 4			Spicer	501a
502	Fageol	5,300	Waukesha, DU.	4	4¼x6½-32.4	S	Waukesha	P	C, Modine	N	Zenith	DG	M, Dixie	N	M, Brown-L.	S, 5	Own	Y	Spicer	502
503	Federal, XC.	4,550	Continental, E4.	4	4¼x5½-32.4	FS	Pharo	P	T, McCord.	Y	Zenith	G	M, Eisemann	N	P, Borg & B.	S, 4	Warner, WXD.	N	Spicer	503
504	Garford, 68	5,000		4	4¼x5½-36.1	F	Simplex	P	T, Own	N	Rayfield	G	M, Splitdorf	N	M.	S, 4		N		504
505	Gary, M.	5,150	Buda, BTU	4	5x6½-40.0	F	McCanna	P	T, Chicago	Y	Master	G	M, Eisemann	N	M, Brown-L.	S, 4	Brown-L, 60	N	Spicer	505
506	GMC, 101A	4,775	Continental, E4.	4	4¼x5½-32.4	FS	Monarch	P	T, Own	N	Marvel	G	M, Eisemann	N	M, Own	S, 4	Own	N	Own	506
507	Gramm-Bernstein, 50	5,875	Continental, B2.	4	4¼x6-36.1	F		P	T, Own	Y	Stromberg.	G	M, Eisemann	N	M, Own	I, 4	Own	N	Own	507
508	Hall (chain)	4,850	Continental, E4.	4	4¼x5½-32.4	FS	Simplex	P	T, G & O.	Y	Zenith	G	M, Eisemann	N	M, Brown-L.	S, 4	Brown-L, 50	N	Hartford	508
509	Hall (worm)	4,850	Continental, E4.	4	4¼x5½-32.4	FS	Simplex	T	T, Long	Y	Zenith	G	M, Eisemann	N	M, Brown-L.	S, 4	Brown-L, 60	N	Spicer	509
510	Harvey, WKA	5,200	Buda	4	4¼x6-32.4	F	Duplex	P	T, Chicago		Stromberg.		M, Eisemann		P, Borg & B.	S, 4	Brown-Lipe			510
511	Highway-Knight, B		Moline-K., W	4	4x6-25.6	F		P	T, Own	N	Zenith	G	M, Eisemann	Y	M, Brown-L.	S, 4	Own	N	Thermoid	511
512	Hurlburt, D.	5,250	Buda, YTU	4	4¼x6-32.4	FS	Duplex	P	T, Own		Flechter		M, Eisemann	N	M, Brown-L.	S, 4	Brown-L, 60			512
513	Indiana, 50	5,075	Waukesha, PU7.	4	4¼x6½-36.1	F	Waukesha	P	T, Long	Y	Stromberg.	G	M, Eisemann	N	P, Borg & B.	S, 4	Brown-L, 60	N	Spicer	513
514	Kelly-Springfield, K50	5,150	Own	4	4¼x6½-32.4	F	Pierce	P	C, Long	N	Zenith	G	M, Eisemann	N	C, Own	S, 3	Covert, F	N	Own	514
515	Kimball, F.	5,975	Wisconsin, JAU.	4	5¼x6-42.0	FS	Duplex	P	C, Flexo	N	Zenith	D	M, Berling.	N	M, Brown-L.	S, 4	Brown-L, 60	N	Spicer	515
516	Kissel, Goliath	5,085	Own	4	4¼x5½-28.9	S	Pierce	P	T, Fedders	N	Stromberg.	G	M, Eisemann	N	M, Warner	S, 4	Warner, T53	N	Spicer	516
517	Kleiber, D.	5,300	Continental, T.	4	5¼x5½-44.1	S	Pierce	P	T, R'e-T'rn'y.	N	Stromberg.	G	M, Bosch	N	M, Hele-Shaw.	S, 4	Brown-L, 60-4	N	Spicer	517
518	Larrabee, T.		Continental, E4.	4	4¼x5½-32.4	S	Simplex	P	T, Bush	N	Schebler	G	M, Bosch	N	M, Brown-L.	S, 4	Brown-L, 60	N	Spicer	518
519	Mack, AC.	5,500	Own	4	5x6-40.0	S	Own	P	T, Own	N	Zenith	G	M, Aero	N	P, Own	S, 3	Own	Y	Spicer	519
520	Mapleleaf, DD		Hinkley, HA1600	4	4¼x5½-32.4	FS	Hinkley	P	T, McCord.	Y	Stromberg.	G	M, Bosch	N	M, Fuller	S, 4	Fuller, H	N	Blood	520
520a	Master, F (int)	5,540	Buda, ATU	4	4¼x6½-36.1	F	Pierce	P	T, Own	N	Master	G	M, Eisemann	N	M, Brown-L.	S, 4	Brown-L, 60	Y	Spicer	520a
521	Master, B (worm)	5,290	Buda, ATU	4	4¼x6½-36.1	F	Pierce	P	T, Own	N	Master	G	M, Eisemann	N	M, Brown-L.	S, 4	Brown-L, 60	Y	Spicer	521
522	Menominee, J.		Wisconsin, A	4	4¼x5½-36.1	S		P	T, Own	N	Stromberg.	G	M, Eisemann	N	P, Borg & B.	S, 4	Brown-L, 60	N	Spicer	522
523	Moreland, 19J	5,350	Cont'l, Class B.	4	4¼x6-36.1	F	Cont'l	P	T, Own	N	Master	D	M, Dixie	N	M, Own	S, 4	Own	N	Thermoid	523
524	National, JA.		Waukesha, PU7.	4	4¼x6½-36.1	S	Waukesha	P	C, McKinnon	Y	Zenith	G	M, Eisemann	N	M, Hele-Shaw.	S, 4	Brown-L, 60	N	Spicer	524
525	Nelson & LeMoon, F5.		Continental, B2.	4	4¼x6-36.1	F	Pierce	P	T, Chicago		Stromberg.		M, Bosch		M, Brown-L.	S, 4	Brown-L, 60		Thermoid	525
526	Old Reliable, D.	5,000	Wisconsin, J	4	5 1-10x5½-42.0	F	Monarch	P	T, Chicago	Y	Stromberg.	G	M, Bosch	N	M, Universal	S, 4	Savage, SD60	Y	Spicer	526
527	Packard, 5E.	5,450	Own	4	5x5½-40.0	F	Own	P	T, Fedders	N	Own	G	M, Dixie	N	M, Own	S, 4	Own	N	Ther-Sp.	527
528	Parker, M20	5,500	Wisconsin, RAU.	4	4¼x6-36.1	F	Simplex	P	T, Bremer	Y	Stromberg.	G	M, Bosch	Y	M, Brown-L.	S, 4	Warner, T53-1	N	Kinsler-B.	528
530	Pierce-Arrow, R9	5,500	Own	4	4¼x6-38.0	F	Own	P	T, Own	N	Stromberg.	G	M, Dixie	N	C, Own	S, 3	Own	Y	Own	530
531	Reynolds, 10A	5,800	Own	4	4¼x5½-32.4	F	Hinkley	P	T, Own	Y	Stromberg.	dgk	M, Bosch	Y	M, Own	S, 4	Own		Thermoid	531
532	Rowe, FW	5,390	Wisconsin, AU.	4	4¼x6-32.4	F	Simplex	P	C, Fedders		Zenith		M, Bosch		M, Brown-L.	S, 4	Brown-L, 60		Spicer	532
533	Royal	5,000	Wisconsin	4	4¼x5½-36.1		Monarch	P	T, Kells		Stromberg.		M, Bosch		M, Hele-Shaw.	I, 3	Own			533
534	Sandow, L.	4,775	Continental, E4.	4	4¼x5½-32.4	S	Monarch	P	T, Chicago	Y	Stromberg.	G	M, Bosch	N	M, Brown-L.	S, 4	Brown-L, 60	N	Spicer	534
535	Sanford, W50	4,950	Continental, E4.	4	4¼x5½-32.4	F	Pierce	P	T, Long	N	Stromberg.	G	M, Bosch	N	P, Borg & B.	S, 4	Brown-L, 60	N	Spicer	535
536	Schacht		Buda, YTU	4	4¼x6-32.4	F	Duplex	P	T, Own	N	Schebler	G	M, Bosch	N	C, Own	S, 8	Own	N	M & E.	536
537	Schwartz, D.	4,500	Buda, YTU	4	4¼x6-32.4	F	Simplex	P	C, Fedders	Y	Stromberg.	G	M, Bosch	N	M, Brown-L.	S, 4	Brown-L, 60	N	M & E.	537
538	Selden, 5A		Continental, B2.	4	4¼x6-36.1	F	Cont'l	P	T, Long	Y	Stromberg.	G	M, Eisemann	N	M, Detlaff	S, 4	Brown-L, 60	Y	Spicer	538
539	Service, 101	5,275	Buda, YU	4	4¼x6-32.4	F	Simplex	P	T, Long	N	Stromberg.	G	M, Eisemann	N	P, Borg & B.	S, 4	Brown-L, 60	N	Spicer	539
540	Signal, R.	5,300	Continental, B2.	4	4¼x6-361	FS	Pierce	P	T, McCord.	Y	Stromberg.	G	M, Eisemann	N	M, Brown-L.	S, 4	Brown-L, 60	N	Spicer	540
541	Standard, 86		Continental, E7.	4	4¼x5½-32.4	FS	Monarch	P	T, Long	Y	Stromberg.	G	M, Eisemann	N	M, Brown-L.	S, 4	Brown-L, 60	N	Spicer	541
542	Sterling (chain)	5,600	Own	4	5x6½-40.0	F	Waukesha	P	C, Own	Y	Rayfield	G	M, Eisemann		M, M & E.	I, 6	Own	N	Universal	542
543	Sterling, (worm)	5,350	Own	4	5x6½-40.0	F	Waukesha	P	C, Own	Y	Rayfield	G	M, Eisemann		M, M & E.	I, 3	Own	N	Spicer	543
544	Super, 100		Wisconsin, RAU.	4	4¼x6-36.1	F	Simplex	P	T, Chicago	Y	Zenith	G	M, Bosch	N	M, Hilliard	S, 4	Savage, SD60	Y	Spicer	544
545	Tiffin, TW.	5,250	Continental, B2.	4	4¼x6-36.1	FS	Cont'l	P	T, Own	Y	Schebler	G	M, Eisemann	N	P, Borg & B.	I, 4	Cotta, S	Y	Peters	545
546	Titan	5,400	Buda, YTU	4	4¼x6-32.4	F	Simplex	P	T, B & W	N	Stromberg.	G	M, Eisemann	N	P, Borg & B.	I, 4	Cotta, S	N	M & E.	546
547	United, V.		Buda, YU	4	4¼x6-32.4	F	Simplex	P	T, G & O		Stromberg.		M, Bosch		M, Brown-L.	S, 4	Brown-L, 60			547
548	U. S., K.	4,850	Waukesha, P.	4	4¼x6½-36.1	F	Waukesha	P	T, Long		Stromberg.		M, Eisemann		P, Borg & B.	S, 4	Brown-L, 60			548
549	Walter, (N. Y.), S.	5,500	Waukesha, DU.	4	4¼x6½-32.4	F	Own	P	T, Bush	Y	Stromberg.	G	M, Simms	Y	M, Brown-L.	S, 4	Warner, T53		M & E.	549
550	Ward LaFrance, 5A	5,490		4	5x6½-40.0	F		P	T, Own	Y	Zenith	G	M, Bosch	N	M, Brown-L.	S, 4	Brown-L, 60	N	Spicer	550
551	White, 45	5,000	Own	4	4¼x5½-28.9	F	Own	P	T, Own	N	Own	G	M	N	P, Own	S, 4	Own	N	Own	551
551a	Wichita, S	5,000	Beaver, JA	4	4¼x6-32.4	P	Duplex	P	C, E & M	Y	Stromberg.	G	M	N	C	S, –	Own	N	Thermoid	551a
552	Wilcox, W		Waukesha, P.	4	4¼x6-36.1	S	Waukesha	P	T, Long	N	Stromberg.	G	M, Bosch	N	C, Own	S, 4	Own	N		552
553	Wilson	4,800	Continental, E7.	4	4¼x5½-32.4	FS	Pierce	P	T, Own	N	Marvel	G	M, Eisemann	N	M, Brown-L.	S, 4	Brown-L, 60	N	Hartford	553
554	Winther, 109	5,250	Wisconsin, VAU.	4	4¼x6-32.4	F	Duplex	P	T, Bremer	N	Master	G	M, Eisemann	N	P, Borg & B.	S, 4	Brown-L, 60	N	Blood	554
	11,000 Pounds:																			
555	Maccar, G-1	5,500	Wisc., RBU	4	5x6-40.0	F	Pierce	P	T, Own	N	Zenith	G	M, Eisemann	N	M, Brown-L, 60	S, 4	Brown-L, 60	N	Spicer	555
	12,000 Pounds:																			
556	Doane	5,350	Waukesha, PU7.	4	4¼x6½-36.1	S	Waukesha	P	C, Own		Master		M, Bosch		M, Brown-L.	S, 3				556
557	Kelly-Springfield, K60	5,500	Own	4	4¼x—32.4	F	Pierce	P	C, Long	N	Zenith	G	M, Eisemann	N	C, Own	S, 3	Covert, F	N	Own	557
558	Packard, 6E.	5,700	Own	4	5x5½-40.0	F	Own	P	T, Fedders	N	Own	G	M, Dixie	N	M, Own	S, 4	Own	N	Ther-Sp.	558
559	Royal	5,400	Wisconsin	4	5¼x6-42.0		Monarch	P	T, Kells		Stromberg.		M, Bosch		M, Hele-Shaw.	I, 3	Own			559
560	Tiffin, UW	5,450	Continental, B2.	4	4¼x6-36.1	FS	Cont'l	P	T, Own	Y	Schebler	G	M, Eisemann	N	P, Borg & B.	I, 4	Cotta, S	Y	Peters	560
561	United, T.		Buda, HU	4	4¼x5½-28.9	F	Simplex	P	T, G & O		Stromberg.		M, Bosch		M, Brown-L.	S, 4	Muncie, 63			561
	13,000 Pounds																			
563	Mack, AC	$5,750	Own	4	5x6-40.0	S	Own	P	T, Own	N	Zenith	G	M, Aero	N	P Own	S, 3	Own	Y	Spicer	563
	14,000 Pounds:																			
563a	Available, H7	6,000	Waukesha	4	5x6½-40.0	FS	Waukesha	P	T, Chicago	Y	Stromberg.	G	BM, Bosch	N	M, Brown-L.	S, 4	Brown-Lipe		Spicer	563a
564	Couple-Gear, LDC	7,350	Wisconsin	4	5¼x7-44.1	FS	N	P	C, Ideal	Y	Stromberg.	G	BM, E'sm'nn.	N	†	† 6	Own		Own	564
565	Larrabee, W.		Continental, B2.	4	4¼x6-36.1	F	Cont'l	P	T, Bush	N	Schebler	G	M, Bosch	N	M, Brown-L.	S, 4	Brown-L, 60	N	Spicer	565
566	Old Reliable, K	6,000	Waukesha, P.	4	4¼x6½-36.1	S	Waukesha	P	T, Chicago	Y	Stromberg.	G	M, Bosch	N	M, Universal	S, 4	Savage, 6495	Y	Hartford	566
567	Royal	6,500	Wisconsin	4	5¼x7-44.2		Monarch	P	T, Kells		Stromberg.		M, Bosch		M, Hele-Shaw.	I, 3	Own			567
568	Winther, 140	5,900	Wisconsin, RBU.	4	5 x6-40.0	F	Duplex	P	T, Bremer	N	Master	G	M, Eisemann	N	P, Borg & B.	S, 4	Brown-L, 60	N	Blood	568
	15,000 Pounds:																			
569	Mack, AC	6,000	Own	4	5x6-40.0	S	Own	P	T, Own	N	Zenith	G	M, Aero	N	P, Own	S, 3	Own	Y	Spicer	569
570	Sterling	6,000	Own	4	5x6½-40.0	F	Waukesha	P	C, Own	Y	Rayfield	G	M, Eisemann		M, M & E.	I, 6	Own	N	Universal	570

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TRUCK SPECIFICATIONS 10,000—15,000

Line no.	Final drive (Bevel, Chain, Internal-gear, Spur-and-bevel, Worm) and make of rear axle and model number.	Hotchkiss drive? (Yes or No)	Differential (Bevel, Spur, Worm) and make.	Number and location of driving-wheels (Front, Rear).	Clearance under front and rear axles.	Service and emergency brakes (Contracting, Expanding).	Front and rear springs (Cantaliver; 1-2, 2-4, or Full elliptic; Transverse).	Frame material (Pressed-steel, Rolled-steel) and make.	Make of springs.	Leaves in front and rear springs.	Length and width of front and rear springs.	Driver's position (Left, Right).	Make of steering gear.	Turning-circle diameter (feet and inches).	Wheels (Iron, Steel, Wood) and make.	Wheel-base (standard).	Front and rear tire sizes (dual, pneumatic).	Weight of chassis (pounds). Perc. of weight on rear axle when empty & when loaded.	Line no.
501	W, Timken	Y	W	2, R		E, E	P	½, ½	Mather	10, 14	46x3-56x4	L	Gemmer		I, Smith	180	36x6-40x6d	8,790	50, 90	501
501a	W, Timken	Y	W	2, R		E, E	P	½, ½	Mather	10, 14	46x3-56x4	L	Gemmer		S	180	36x6-40x6d	8,790	50,90	501a
502	W, Timken, 6752	N	B	2, R	14½, 10½	E, E	P, Own	½, ½	Mather	9, 16	46x3-60x4	L	Ross	59, 8	W, Prudden	172	36x6-40x6d	8,300	56, 73	502
503	W, Timken, 6752	N	B	2, R	9, 10	E, E	R	½, ½	Mather	8, 16	44x3-56x3½	L	Gemmer	57, 0	I, Smith	156	36x6-40x6d	8,100	65, 78	503
504	C	N	B	2, R		C, E	P	½, ½		10, 17	48x3-50x3	R	Ross		I, Smith	128	36x6-40x6d	8,870		504
505	W, Timken, 6752	Y	W	2, R	9, 10½	E, E	P	½, ½	Detroit	13, 18	46x3-60x4	L	Ross	52, 0	S, Dayton	182	36x6-40x6d	8,500	50, 20	505
506	W, Timken, 6752	N	B	2, R	11½, 10	E, E	R, Own	½, ½	Detroit	10, 16	44x3-54x4	L	Jacox	55, 0	Own	163	36x6-40x6d	8,485	56, 75	506
507	W, Standard	Y	B	2, R	12½, 10½	E, E	P, Own	½, ½	Perfection	10, 16	48x3½-64x4	L	Ross	62, 0	I, Smith	168	36x6-40x6d	9,500	76½, 92½	507
508	C, Timken, 4800	Y	W	2, R	8, 16	E, E	R	½, ½	Detroit	12 18	45x3-52x3½	L	Gemmer		I, Smith	144	36x5-40x6	7,530	25, 80	508
509	W, Timken, 6752	Y	W	2, R	8, 9	E, E	R	½, ½	Perfection	12, 18	45x3-52x4	L	Gemmer		I, Smith	144	36x5-40x6	8,400	25, 80	509
510	W, Sheldon			2, R		E, E	R, Own	½, ½	Sheldon				Ross		I, Smith	160	36x6-40x6d			510
511	W	Y	, R	11, 10½	E, E	P	½, ½	Sheldon		46x3-58x4	L			W, Schwars	159	36x5-40x6d	8,400		511
512	W, Hindley			2, R		E, C	P, Savage	½, ½	Perfection				Ross		W, Wayne	170	36x5-40x6d			512
513	W, Sheldon, W50	N	B	2, R	9½, 10½	E, E	R, Illinois	F, ½	Sheldon	10, 15	40x3-50x4	L	Wohlrab	56, 0	I, Smith	167	36x5-40x6d	8,730	66½, 78½	513
514	C, Own	N	B	2, R	11½, 15½	E, E	P	½, ½	Perfection	11, 14	46½x3-56½x3½	L	Gemmer	56, 0	W	150	36x6-40x6d	9,175	50, 90	514
515	W, Sheldon, W50	Y	B	2, R		E, E	P	½, ½	U. S	12, 16	45½x3-53½x4	L	Ross	39, 6	I, Smith		36x6-40x12		50, 80	515
516	W, Sheldon, W30	Y	W	2, R	10, 8	E, E	P, Smith	½, ½	Mather	11, 13	44x3-62x3½	L	Ross	50, 0	I, Smith	180	36x6-36x6d	7,900	57½, 74½	516
517	W, Timken, 6752	N	W	2, R	9½, 10½	E, E	R, Own	½, ½	Betts	11, 15	50x3-52x4	R	Ross		I, Smith	180	36x6-40x12	9,200	50, 75	517
518	W, Sheldon, W50	Y	B	2, R	14, 10½	E, E	P, Savage	½, ½	Merrill	12, 17	44x3-58x4	L	Ross		I, Smith	178	36x6-40x6d	8,500	40, 84	518
519	C, Own	N	B	2, R	11½, 10½	C, E	P, Own	½, ½	Merrill	9, 13	46x3½-52x4	L	Own	52, 6	W, Own	Opt.	36x6-40x6d	8,650	48, 90	519
520	W, Sheldon, W51	Y	B	2, R	10½, 10½	E, E	R	½, ½	Sheldon	–, 13	46x3-56x4	L	Ross		I, Smith	160	36x6-40x6d	8,600	60, 70	520
520a	I, Walker	Y	BS	2, R		E, E	P, Parish & B	½, ½	Detroit	13, 18	46x3-60x4	L	Ross	50, 0	I, Smith	170	36x6-40x6d	8,000	58, 72	520a
521	W, Timken, 6752	Y	B	2, R	11, 11½	E, E	P, Parish & B	½, ½	Detroit	13, 18	46x3-60x4	L	Ross	50, 0	I, Smith	170	36x6-40x6d	8,000	58, 72	521
522	W, Timken, 6752	N	B	2, R		E, E	R, Own	½, ½	Tuthill	9, 12	44x3-54x4	L	Ross		W, Standard	160	36x6-40x6d	8,500		522
523	W, Timken, 6752	N	W	2, R	9, 10	E, E	P	½, ½	U. S	12, 14		L	Ross		I, Smith	162	36x6-40x6	9,400	55, 67	523
524	W, Timken, 6760	N	W	2, R	9, 10½	E, E	R	½, ½	Mather	11, 19	44x3½-60x4	L	Ross	56, 0	W, Hayes	170	36x6-40x6d	8,650		524
525	W, Timken, 6752	Y		2, R		E, E	R, Own	½, ½	Tuthill				Lavine		W, Prudden		36x6-40x6d			525
526	W, Sheldon, W50	Y	W	2, R	10½, 10½	E, E	R	½, ½	Sheldon	10, 16	48x3-60x4	R	Ross		W, St. Marys	168	36x6-40x6d	8,400	–, 70	526
527	W, Own	N	S	2, R	11½, 9½	C, E	R, Own	½, ½		12, 13	42½x3-54x3½	L	Ross	62, 0	S	156	36x6-40x6d	8,650	57, 76	527
528	W, Own	N	B	2, R	14½, 11	C, E	P, Smith	½, ½	Tuthill	8, 14	44x3-60x4	L	Ross	60, 0	I, Smith	160	36x6-40x6d	8,000	58½, 78	528
530	W, Own	N	W	2, R	12, 10½	C, E	P, Own	, ½	Spring Perch	11, 16	33x2½-48x3	R	Own	50, 6	W, Own	168	36x5-40x6d	8,450	63 75	530
531	W, Own	Y	B	2, R	9½, 10½	E, E	R, Standard	½, ½	Own		44x3-56x4	L	Own		I, Smith	176	36x6-40x6			531
532	W, Sheldon, W50			2, R		E, E	R, Own	½, ½	Sheldon				Ross		W, Hoopes	169	36x6-40x6d	8,240	–, 66	532
533	W, Timken			2, R		E, E	R, Own	½, ½	Merrill				Ross		W	168	36x6-40x6d			533
534	W, Timken, 6752	N	W	2, R	8½, 8	E, E	P, Savage	½, ½	Garden City	10, 20	44x3-56x3½	R	Ross	41, 0	W, Standard	175	36x6-40x6d	7,950	20, 70	534
535	W, Sheldon, W50	Y	B	2, R	10½, 10½	E, E	P	½, ½	Perfection	10, 13	46x3-54x3½	L	Ross	58, 0	I, Smith	174	36x5-40x6d	7,600	80, 87	535
536	W, Own	N	B	2, R	10, 9	C, E	R, Own	½, ½	National	9, 17	35x3-50x3	L	Own		W, St. Marys	168	36x5-40x6d	8,500	80, 80	536
537	I, Torbensen, EI	Y	B	2, R	9½, 11½	E, C	P, Parish	½, ½	Rowland	10, 15	40x3-56x4	L	Ross		I, Smith	170	36x6-36x10	7,600		537
538	W, Timken, 6752	N	B	2, R	–, 10½	E, E	P, Parish & B	½, ½	Perfection	11, 15	46x3½-60x4	L	Gemmer	62, 0	S	164	36x6-40x12	9,700	57, 76	538
539	W, Timken, 6752	N	B	2, R	9, 10½	E, E	P, Own	½, ½	Mather	12, 15	46x3-60x3½	L	Ross	56, 0	S	171½	36x6-40x6d	8,760	–, 75	539
540	W, Timken 6752	N	B	2, R	11, 11	E, E	P, Savage	½, ½	Detroit	11, 18	44x3-56x5	L	Ross	71, 0	I, Smith	180	36x6-40x12	9,510	–, 84	540
541	W, Timken, 6760	N	B	2, R	9, 10	E, E	P, Parish & B	½, ½	Perfection		45½x3-52½x4	L	Gemmer		S, Dayton	160	36x6-40x6d	8,100	64. 75	541
542	C, Own	N	S	2, R	11½, —	E, C	P	½c, ½c	Mather	10, 12	48x3-60x4	L	Ross	47, 9	I, Smith	174	36x6-40x6d	10,000	54, 91	542
543	W, Timken, 6752	N	W	2, R	11½, 10½	E, E	P	½c, ½c	Mather	10, 12	48x3-60x4	L	Ross	47, 2	W, Prudden	168	36x6-40x6d	9,700	53, 92	543
544	W, Sheldon, W51	N	B	2, R	11½, 12	E, E	P	½, ½	Sheldon	11, 13	44x3-58x4	L	Ross	50, 0	S	164	36x5-40x6d	8,500		544
545	W, Sheldon, W51	N	B	2, R	9, 10	E, E	R	½, ½	Kalamasoo	10 16	42x3½-53x4	L	Ross	60, 0	I, Smith	168	36x6-40x6d	8,000	40, 60	545
546	I, Clark, 5	N	B	2, R	12, 16	E, C	P, Parish & B	½, ½	Sheldon	9, 13	48x3-60x3½	L	Lavine	50, 0	S, Clark	156	36x5-40x6d	9,100	57, 80	546
547	I, Clark, 5D			2, R		E, C	P, Detroit	½, ½	Detroit				Ross		S	160	36x5-40x6d			547
548	W, Sheldon, W50			2, R		E, E	R, Own	½, ½	Sheldon				Lavine		S, Dayton	168	36x5-40x6d			548
549	I, Own	Y	W	2, R	14, 14	C, C	P	½, ½	Perfection		48x3-52x5	L	Ross	48, 0	S, Dayton	168	36x6-40x6d	8,000	50, 80	549
550	W, Timken, 6752	N	W	2, R	9½, 10⅝	E, E	P, Detroit	½, ½			50x3-60x4	L	Ross		I, Smith	190	36x6-40x6d	9,300	–, 85	550
551	I, Own	N	BS	2, R	10½, 10½	C, E	R	½, ½				L	Own	61, 0	S	174	36x6-40x6d	7,925	54, 70	551
551a	I	Y	BS	2, R	10½, 9	E, E	P, Own	½, ½	Detroit			R	Ross		S	165	36x6-40x6d	9,200		551a
552	W, Sheldon, W50	N	B	2, R		E, E	P	½, ½	Sheldon	12, 13	48x3½-62x5	L	Own		I, Smith	162	36x5-40x6d	9,100	25, 75	552
553	W, Timken, 6752	Y	B	2, R	9, 10½	E, E	R, Own	½, ½	Perfection	11, 17	46x3-60x4	L	Ross		W	160	36x6-40x6d	7,500	60, 80	553
554	I, Clark, 5D	Y	B	2, R	11, 14	E, E	R, Own	½, ½	Mather	8, 12	46x3-56x4	R	Ross	68, 0	S, Clark	162	36x5-40x6d	8,600	45, 80	554
555	W, Timken, 6752	N	B	2, R	9, 10½	E, E	P, Parish	½, ½	Merrill	11, 15	42x2½-56x4	L	Ross		S, Dayton	186	36x5-40x6d	8,750	–, 70	555
556	C, Own			2, R			R	½, ½					Lavine		S, West	178	36x6-40x6d			556
557	C, Own	N	B	2, R	11½, 15½	E, E	P	½, ½	Perfection	12, 15	48½x3-56½x3½	L	Gemmer	56, 0	W	150	36x6-40x7d	9,500	50, 90	557
558	W, Own	N	S	2, R	11½, 9½	C, E	R	½, ½		12, 14	42½x3-54x3½	L	Ross	62, 0	S	156	36x6-40x7d	8,925	58, 78	558
559	W, Timken			2, R		E, E	R, Own	½, ½	Merrill				Ross		W	168	36x6-40x6d			559
560	W, Sheldon, W51	N	B	2, R	9, 10	E, E	R	½, ½	Kalamasoo	10, 18	42x3½-52x4	L	Ross	34, 6	I, Smith	168	36x6-40x12	9,000	40, 60	560
561	I, Torbensen, C			2, R		E, C	R, Detroit	½, C	Detroit				Jacox		S		34x3½-34x7			561
563	C, Own	N	B	2, R	11½, 10½	C, E	P	½, ½	Merril l	9, 17	46x3½-52x4	L	Own	52, 6	W	Opt.	36x6-40x12	8,672		563
563a	W, Savage	N		2, R		E, E	R, Own	½, ½	Tuthill		44x3-60x4	L	Ross		I, Smith	190	36x6-40x14	10,300		563a
564	B, Own	N		4, FR	11, 11	E, E	R	½, ½	Tuthill	14, 14	50x3½-50x3½	R	Own	36, 0	S, Own	144	36x6-36x6	12,500	50, 50	564
565	W, Sheldon, W51	Y	B	2, R	10, 10	E, E	P	½, ½	Merrill	12, 17	44x3-58x4	L	Ross		I, Smith		36x6-40x12	8,960	42, 86	565
566	C, Sheldon, RA70	N	B	2, R	9⅞, 17	C, E	R	½, ½	Sheldon	11, 13	51½x3½-59½x3½	R	Ross		W, St. Marys	124	36x6-40x7d	10,240	–, 85	566
567	W, Timken			2, R		E, E	R, Own	½, ½	Merrill				Ross		W	168	36x7-40x7d			567
568	I, Clark, 5D	Y	B	2, R	11, 14	E, E	R, Own	½, ½	Mather	13, 16	46x3-56x4	R	Ross	68, 0	S, Clark	162	36x6-40x7d	9,500	45, 80	568
569	C, Own	N	B	2, R	11½, 10½	C, E	P, Own	½c, ½c	Merrill	9, 17	46x3½-52x4	L	Own	52, 6	W, Own	Opt.		9,050	50, 72	569
570	C, Own	N	S	2, R	11½, —	E, C	P	½c, ½c	Mather	10, 14	48x3-60x4	L	Ross	47, 9	I, Smith	174	36x7-40x7d	11,000	66, 91	570

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$50,000 a Year for the Truth

Indiana Highway Transport Association to Compile Figures That Will Take Motor Transport Out of Realms of Theory Into Land of Facts

WHILE much has been said about interstate traffic by motor truck, the fact remains that heretofore such systems have not been operated systematically enough to give valuable data as to the cost and practicability of such projects. In addition, such records as have been kept have not been coördinated properly by a central office with nothing else to do.

The Indiana Highway Transport Association, formed at Indianapolis following a series of conferences during the latter part of April, proposes to give motor truck hauling a real tryout. All of the big industries are represented on the board of directors of the new organization, and this lends a cosmopolitan aspect to the new body. Tom Snyder, elected secretary of the association, announces that about $50,000 will be spent in the next year, largely for the compilation of figures that will take motor transport out of the experimental or theoretic stage and put it on the basis of cold facts.

An expert will be hired to do nothing but keep records, and put them into the proper form, so that the Indiana association will have figures on every phase of hauling all sorts of products varying distances over roads of different kinds. The new association, it is worth noting, will work under the supervision of the National Highway Council, which has been perplexed by the problems mentioned, and which has felt that the work of collecting data has been on anything but an efficient basis. In short, the Indiana Highway Transport Association will be an experimental field for the country.

Roy Adams, of J. D. Adams & Company, manufacturers of road machinery, is president of the association. Lewis Taylor, of the Indiana Federation of Farmers' Associations, is vice president; Mr. Snyder, secretary, and C. W. Abrahams, treasurer of the Indiana Transfer & Warehousemen's Association, treasurer.

THE affiliations of the board of directors are more important than the identity of the members. The board was made up on this basis:

Indianapolis Transfer Association, 4; Indiana Transfer & Warehousemen's Association, 2; truck tire industry, 1; motor truck industry, 1; oil industry, 1; wholesale shippers, 2; Indiana Federation of Farmers' Associations, 1; Purdue University, 1; American Association of Engineers, 1, and agricultural implement industry, 1.

A total of fifteen directors were named.

The object of the association was given as "the immediate and practical application of the motor truck and the highway to transportation and distribution."

The association already has acquired the old freight depot of the Cincinnati, Indianapolis & Western Railway, as a terminal station. The building is 40 by 100 feet, with a loading platform containing 2,500 square feet and an office 20 by 40 feet. It is to this point that outbound loads will be brought and at which incoming motor trucks will deposit their burdens. The same plan will be followed in other important cities of Indiana. In other words, the motor trucks utilized in the hauls from one city to another will not be asked to do the local delivery. They will deliver to and pick-up at central stations. The theory is the same as that on which freight trains are operated. They do not worry with the details of city delivery, but confine themselves to getting to a central station.

The following rates have been adopted for motor truck service to and from Indianapolis:

Distance	Hauling charge	Terminal charge
1 to 10 miles..	3c 100 lbs. per mile...	*12c
10 to 25 miles..	2c 100 lbs. per mile...	12c
25 to 50 miles..	1¾c 100 lbs. per mile...	12c
Over 50 miles..	1¼c 100 lbs. per mile...	12c

*$1.20 per ton at each terminal.

While these basic rates will enable anyone to ascertain the cost of hauling a given load, the association has issued the following table, showing the comparative cost with steam transportation:

Household goods and articles classified higher than first class in the official classification (steam road) to be charged for at double the rates named herein. Minimum shipment, 75c.

Miles	Hauling Charge	Terminal Charge	Total Rate	Steam Road Rate, 3d Class
1	$0.03	$0 12	$0.15	$0.17
2	.06	.12	.18	.17
3	.09	.12	.21	.17
4	.12	.12	.24	.17
5	.15	.12	.27	.17
6	.18	.12	.30	.17
7	.21	.12	.33	.17
8	.24	.12	.36	.17
9	.27	.12	.39	.17
10	.30	.12	.42	.17
11	.30	.12	.42	.17
12	.30	.12	.42	.17
13	.30	.12	.42	.17
14	.30	.12	.42	.17
15	.30	.12	.42	.17
16	.32	.12	.44	.18½
17	.34	.12	.46	.18½
18	.36	.12	.48	.18½
19	.38	.12	.50	.18½
20	.40	.12	.52	.18½
21	.42	.12	.54	.19½
22	.44	.12	.56	.19½
23	.46	.12	.58	.19½
24	.48	.12	.60	.19½
25	.50	.12	.62	.19½
26	.50	.12	.62	.20
27	.50	.12	.62	.20
28	.50	.12	.62	.20
29	.51	.12	.63	.20
30	.53	.12	.65	.20
31	.54	.12	.66	.21½
32	.56	.12	.68	.21½
33	.58	.12	.70	.21½
34	.60	.12	.72	.21½
35	.61	.12	.73	.21½
36	.63	.12	.75	.22
37	.65	.12	.77	.22
38	.67	.12	.79	.22
39	.68	.12	.80	.22
40	.70	.12	.82	.22
41	.72	.12	.84	.23
42	.74	.12	.86	.23
43	.75	.12	.87	.23
44	.77	.12	.89	.23
45	.79	.12	.91	.23
46	.81	.12	.93	.24¼
47	.82	.12	.94	.24½
48	.84	.12	.96	.24½
49	.86	.12	.98	.24½
50	.88	.12	1.00	.24½
51	.88	.12	1.00	.25
52	.88	.12	1.00	.25
53	.88	.12	1.00	.25
54	.88	.12	1.00	.25
55	.88	.12	1.00	.25
56	.88	.12	1.00	.25
57	.88	.12	1.00	.25
58	.88	.12	1.00	.25
59	.88	.12	1.00	.25
60	.90	.12	1.02	.25
61	.92	.12	1.04	.25½
62	.93	.12	1.05	.25½
63	.95	.12	1.07	.25½
64	.96	.12	1.08	.25½
65	.98	.12	1.10	.25½
66	.99	.12	1.11	.26
67	1.00	.12	1.12	.26
68	1.02	.12	1.14	.26
69	1.04	.12	1.16	.26
70	1.05	.12	1.17	.26
71	1.07	.12	1.19	.26½
72	1.08	.12	1.20	.26½
73	1.10	.12	1.22	.26½
74	1.11	.12	1.23	.26½
75	1.13	.12	1.25	.26½
76	1.14	.12	1.26	.27
77	1.16	.12	1.28	.27
78	1.17	.12	1.29	.27
79	1.19	.12	1.31	.27
80	1.20	.12	1.32	.27
81	1.22	.12	1.34	.28
82	1.23	.12	1.35	.28
83	1.25	.12	1.37	.28
84	1.26	.12	1.38	.28
85	1.28	.12	1.40	.28
86	1.29	.12	1.41	.28
87	1.31	.12	1.43	.28
88	1.32	.12	1.44	.28
89	1.34	.12	1.46	.28

The rates indicated are subject to change as experience warrants a revision in either direction.

MEMBERSHIPS in the association are being solicited among shippers and others at $25 a year, and cordial coöperation is being met.

The association found encouragement in the results of a survey of the situation in Indianapolis, which resulted in the following discoveries:

That the industrial loss caused by limited electric traction terminal facilities creating delays of vehicles while waiting to discharge their loads to limited platforms is over $200,000 a year.

That in Indianapolis steam freight yards from 3,500 to 5,000 freight cars are constantly awaiting limited terminal facilities.

That demurrage charges in Indianapolis are over $50,000 a year.

Covert Transmission Centralizes Effort

On account of the rapid expansion of its business, and the resulting need for more centralized administration, President Alwin A. Gloetzner of the Covert Gear Company, Inc., announces the consolidation of all the company's departments, including sales, service and engineering, at its manufacturing headquarters in Lockport, New York, where recent factory additions now allows the company to be adequately housed and equipped. R. C. Merchant, sales manager, moved his headquarters from Detroit to Lockport several weeks ago. The company's Detroit headquarters in the Hayward Building, 967½ Woodward avenue, will be continued in coöperation with the Lonney & Carmichael Sales Company.

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Trucks First-Aid in Flight of Italian Marble Angels

FIATS EMPTY QUARRIES OF RAW PRODUCT

With her quarries at Seravezza, not far from Pisa, Italy possesses the finest supply of marble in the world, and is the greatest European exporter of this stone. The Seravezza marble quarries have been in active operation since 1517, when Pope Leon X instructed Michael Angelo to exploit these regions, and since then they have furnished material for the finest palaces and churches in Rome, Florence and other Italian cities.

From the outset transportation was the greatest difficulty to be overcome in connection with the working of these quarries. The marble is quarried out of the mountain side, to an altitude of 4,000 feet, and roads have to be made as the work proceeds. The gradients are high, running up to 40 per centum in many places; in addition the turns are very sharp, and except on the main approaches all the roads are thickly strewn with loose stone.

The blocks of marble, weighing 15 to 20 tons each, have to be handled with the greatest precaution and call for an infinite amount of hand labor. Until quite recently ox-teams have been made use of almost exclusively for the transportation of blocks of marble in these quarries. The work with these animals is naturally slow, for even on good roads they do not travel at more than two miles an hour. For the biggest loads it is necessary to use 16 to 18 pairs of oxen, which cover a total length of not less than 250 feet. This length is most disadvantageous, for it not only necessitates the presence of 20 or more drivers, but on the steep winding portions of the mountain only a small number of animals can do really useful work.

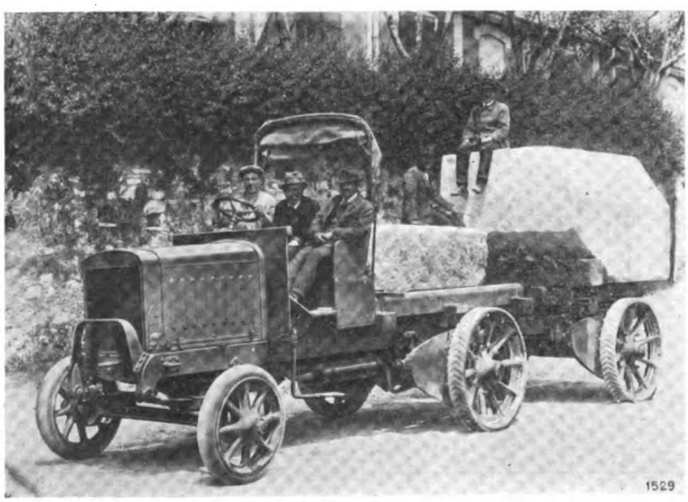
In an attempt to solve the transportation problem, steam locomobiles were adopted and proved fairly successful on the good roads, notwithstanding the high cost of fuel and maintenance. These locomobiles were not found suitable, however, for bringing stone from the mouth of the quarry or for traveling over the roughest surfaces and climbing the steepest gradients.

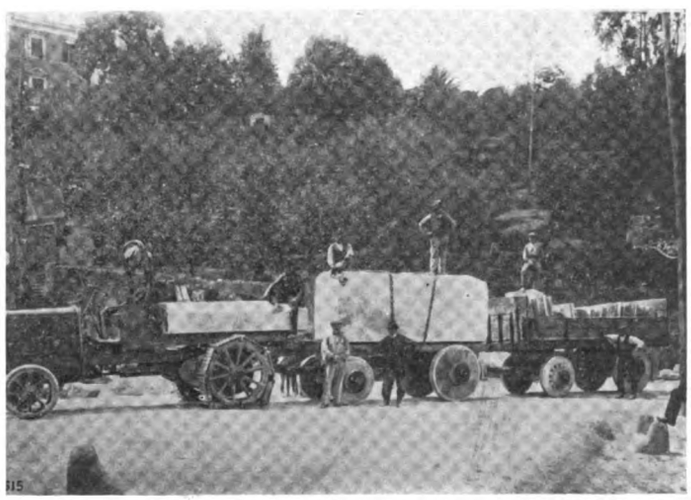
Huge block of marble leaving quarry.

The most recent adoption, and one which has been entirely successful, is that of the Fiat 70-h.p. gasolene tractor. This has been tried in competition with both locomobiles and ox-teams and has given such good results that it is now driving out both. Its greatest advantages are speed and lower operating costs. The maximum useful load handled may be taken at 30 tons. This would entail the presence of 18 drivers (one for each pair of oxen) and at least 6 men to be in attendance for applying the brakes and for assistance when on the difficult turns. With the Fiat tractor only one driver is required and 4 men are quite sufficient to accompany the load over the difficult portions of the road. This means a saving of the labor of 19 men.

The overall length of the tractor being only 16 feet, no great difficulty is experienced in getting round the sharp, hairpin turns, even when they are on a gradient of 20 per centum. If the trailer, on which the greatest load is carried, can not be taken round by direct haulage, the tractor first makes the turn and then pulls its trailer or trailers around by means of its engine-operated winch. In this way it is possible to get big blocks of marble from positions which would be altogether inaccessible to ox-teams, or which would entail the building of special roads at very considerable expense.

The gasolene tractor employed for this work is a type produced before the war by the Fiat Company and employed very extensively during the war for the haulage of big guns. Its engine is a 4-cylinder vertical type developing 70 h.p. Except, of course, in the matter of dimensions, the general construction of the tractor follows that of the Fiat lorries. There are four speeds and reverse, and the final drive is by means of enclosed chains. While the front wheels are ordinary cast-steel type fitted with solid rubber tires, the rear wheels are all-steel, with a diameter of 47





Fiat motor trucks replace horses in Italian marble quarry.

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inches, and are designed to receive special creeper bands. This really constitutes an endless chain with eight very broad links. They are fastened to studs on the circumference of the wheel, and travel round with it, enormously increasing the adherence and making it possible to travel over country which would be impassable without this device. On good roads these bands are not needed, but in the quarries they are always in service.

For work in such a district very close attention has to be paid to brakes. The foot brake operates on the transmission, and the rear wheel brakes are controlled by hand. In order to facilitate descents, the two rear wheel brakes can be operated simultaneously or independently. This is of great value when taking a sharp turn on a steep down grade.

Most of the load is carried on 4-wheel trailers, the tractor itself only receiving a useful load of 3½ tons. Over good, level roads the Fiat tractor can haul 100 tons, but in the quarries it is rarely that more than 30 tons are taken at one time. Such a load is generally distributed over two trailers.

Successful Dealers

(*Continued from page 57.*)

ers are salesmen and not business men. They are so keen to make a sale and thus prevent a rival from making one, that they throw discretion to the winds and the result is that too many machines are sold without a legitimate profit. They allow their enthusiasm to run away with their judgment and not only shave the price, but make all kinds of promises in relation to service and the care of the vehicle sold. A dealer either knows at the time he is making the sale, that he can not possibly fulfill his promises and make money, or he is so blinded that he is willing to do business at a loss to defeat a competitor.

"This question of service must be readjusted. The buyer of a motor truck, tractor, or passenger car must from necessity be educated to the fact that the dealer can not take care of the vehicle when the wear or breakage is not due to poor workmanship or material. If a dealer wishes to remain in business and continue successful he must face the cold, hard fact that free service is ruinous. He is not in business for his health but to make money. He can not afford to give a tire here, nor a lamp there, or, in fact, any other accessories, without proper remuneration. If, after inventory, a dealer finds that he is not making a legitimate profit, he is probably afflicted with the 'Servicitis' germ. It is up to him to properly diagnose the disease and cure it, no matter how heroic the remedy. A dealer can blame no one but himself if he goes beyond the warranty of the manufacturer.

"All leading producers have adopted the ninety-day guarantee. This is standard, equitable, and fair and square. There is no short cut to the benefits of good motor truck service in buying a reliable machine. It is useless for a business man to expect big returns from a motor truck investment if he tries to shorten the corners by purchasing an untried or discredited vehicle. Reputation is a big asset in motor truck buying. It is a bond of dependability, endorsed by those who know from experience," concluded Long.

Truck Meets 29,200 Trains Through Four-Year Period Without a Miss

Meeting twenty overland trains from the east daily, three hundred sixty-five days in the year, for over four years, a total of over 29,000 trains without a miss, is the record of a Federal motor truck at Oakland, California.

The Yosemite Laundry Company, owner of this truck, handles at its Oakland establishment all the laundry work of the Pullman Company west of Chicago, under exclusive contract. Trains must be met on schedule, day in and day out—a missed train might cause a cancelled contract.

This motor truck has established a record for consistent performance on this work, collecting in an eight hour day more than 20,000 pieces of linen, as well as returning them in time for the train's next trip. A full capacity load is carried each trip, which has proved to be an economical factor in this line of business, for, compared to the former methods of horse-drawn equipment, a tremendous saving has been effected, in time and in the amount of delivery equipment necessary to efficiently handle this number of trains daily.

So well has this machine served its owners, that they recently added another motor truck to their haulage equipment, the purchase of which was decided upon through the unusually consistent manner that their deliveries to trains have been handled by their first motor equipment.

Picks Ripe Market with Truck.

That it allows him to pick out his top hogs and take them to market in small lots is the reason given by Alf Kreubel, farmer in Holt county, Missouri, for favoring the motor truck in transporting his livestock.

"If you are feeding a car of hogs," he says, "you always have to feed some longer than they should be fed, waiting for some others to be ready for market." He uses a one-ton motor truck to haul his livestock 35 miles.

Claims Ton-Mile Hauling Costs of 21⅔ Cents on 45-Mile Daily Run

A motor truck owner in the vicinity of Albuquerque, New Mexico, has kept careful record of the cost of operating two 3½-ton Duplex machines, the figures being 21⅔ cents per ton-mile. In computing this cost the owner has been conservative, and has included every item in its operation.

The motor trucks referred to are equipped with dump bodies, and are engaged in hauling dirt.

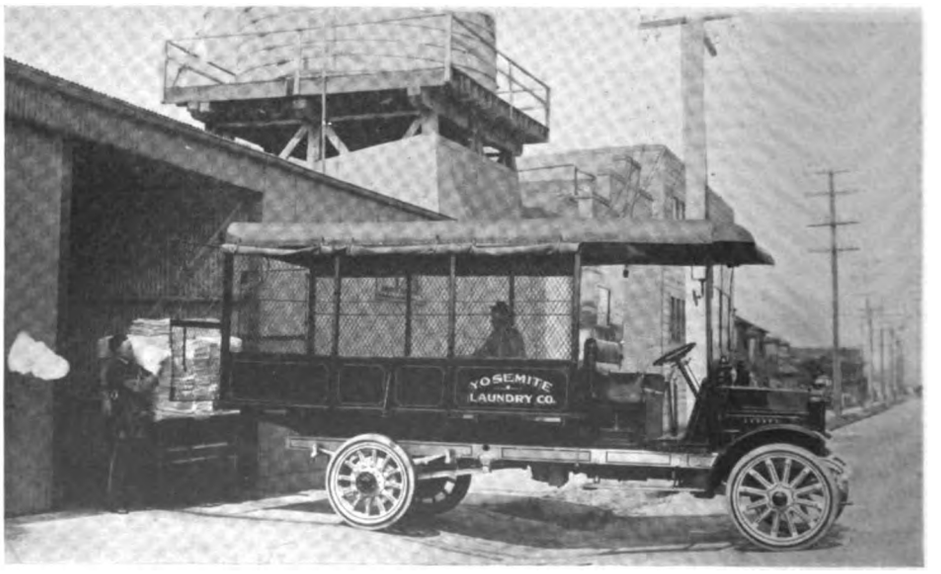
The value of the machines is figured at $5,000 each, with interest figured at 8 per centum and depreciation of 15 per centum; gasolene is figured at 30 cents per gallon, and oil at $1 per gallon. Driver's wages are based on $4 per day and loaders at $3 per day. The load is 2¼ miles one way or 4½ for the round trip, and each motor truck made ten trips per day, or a total of twenty trips for the two. Following is an itemized daily expense for operating the two motor trucks, operation being based on 300 working days per year:

Gasolene, 20 gallons	$ 6.00
Oil, 2 quarts	.50
Labor, 2 drivers	8.00
Labor, 3 loaders	9.00
Interest and taxes	3.00
Depreciation	5.00
Maintenance (Sunday greasing, etc.)	1.00
Repairs	2.00
Tires (7,500 miles)	3.50
Garage	.60
Insurance	.40
	$39.00

The above total cost of hauling a payload of 80 tons 2¼ miles—or a total of 180 ton-miles—represents a ton-mile cost of 21 2/3 cents.

Non-Gran Not in Suit

The American Bronze Corporation, of Berwyn, Pennsylvania, manufacturers of Non-Gran Bearing Bronze, is in no way connected nor ever has been connected with any other company manufacturing bearing bronze. This announcement is made to prevent any confusion arising as to our connection with a company of identical name incorporated in another state, against which, according to an item in a recent Philadelphia paper, a petition in bankruptcy has been filed.



Truck that has never missed a trip.

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YOU can depend upon *good* equipment in emergency.

No delays—fewer repairs—more real mileage—when your busy apparatus rolls on UNITED STATES SOLID TRUCK TIRES. Fire fighting officials everywhere, unanimously declare that—

United States Tires are Good Tires

US
UNITED STATES RUBBER COMPANY
AND ASSOCIATED COMPANIES
RUBBER SYSTEM

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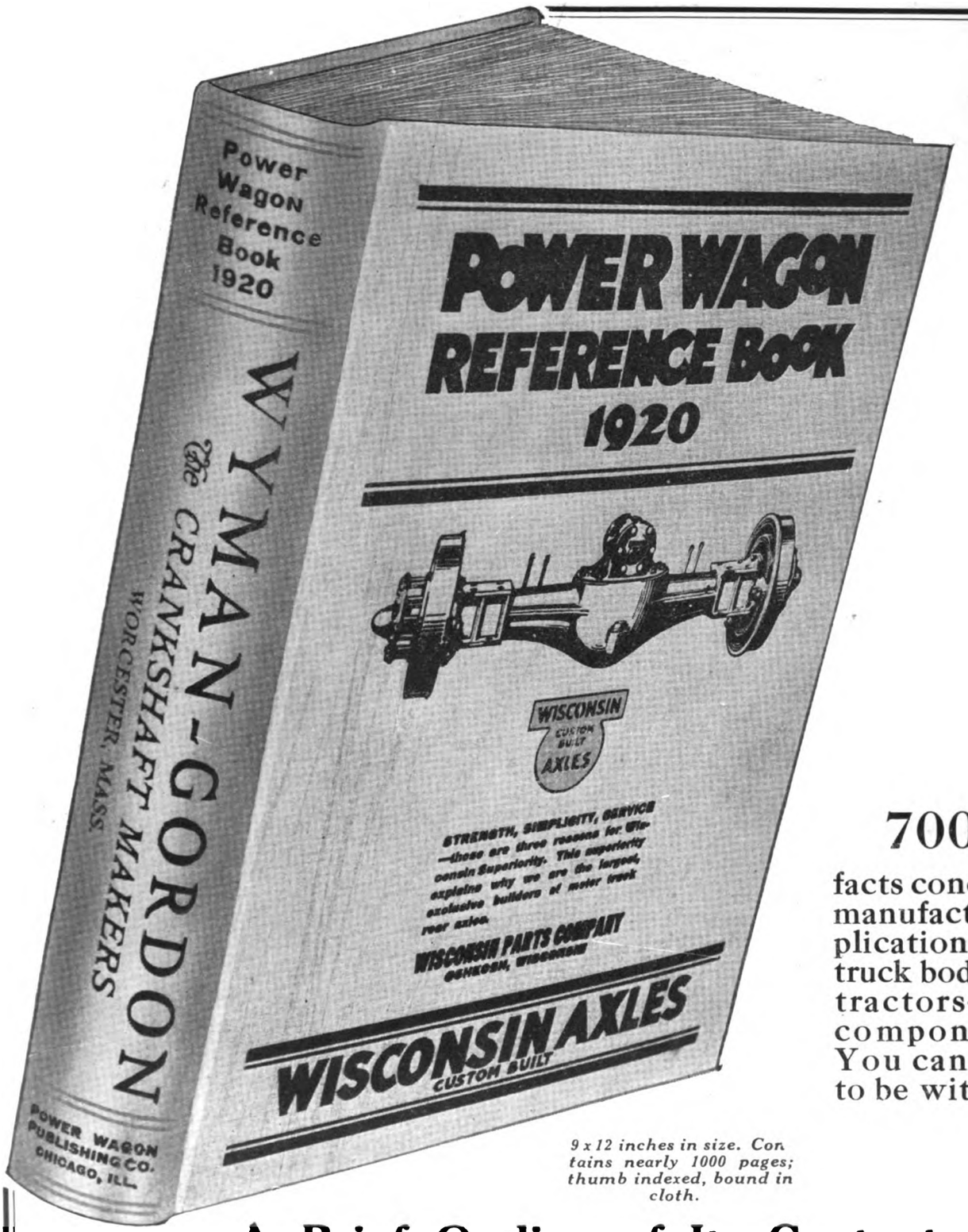

9 x 12 inches in size. Contains nearly 1000 pages; thumb indexed, bound in cloth.

700,000

facts concerning the manufacture and application of trucks, truck bodies, trailers, tractors—and their component parts. You cannot afford to be without them.

A Brief Outline of Its Contents

Specifications

"Reference Book" Specifications are not limited to a statement of the makes of the various parts used in the construction of Motor Trucks, Farm Tractors and Trailers. They include dimensions of all kinds—detailed technical descriptions of the parts themselves. The 125,000 separate facts contained in these tables are so conveniently arranged that it is unnecessary to turn the book in order to read the various column headings. Everything can be seen at a glance—a helpful feature that is to be found **only** in the "Reference Book."

Blue Prints

The book contains 156 pages of blue prints printed in color. Every drawing was prepared with great care and at heavy cost by our technical department from prints and original data secured from the manufacturers. These prints cannot be found in any other publication. They afford the reader an accurate and true view of design and construction, and illustrate many important features of the machines displayed that could not be shown as well by any other means. The blue print section will be of great value to dealers and manufacturers.

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GOOD BUSINESS

The 1920 Reference Book is an invaluable aid to good business. It is an encyclopedia of construction and design for manufacturers. It enables the dealer to meet competition more intelligently. He **can clinch sales with facts.** It helps the user to solve his transportation problems. It is the most complete and the most frequently used book of facts ever printed for the automotive industry. The text is thumb-indexed and sectionalized for immediate reference.

Motor Trucks

There are 582 different models of motor trucks on the market. The "Reference Book" contains the most complete and the most detailed set of motor truck specifications ever printed. These cover every important feature of design and construction.

113 full page blue prints of the principal trucks on the market are printed in color.

The 103 pages describing the operation of motor trucks in the principal lines of trade offer an intensely interesting and highly instructive feature for the individual who needs facts on Transportaton costs and problems. These studies of operation—prepared at great cost—contain the vital facts about the economy of the machine—and coupled with each study are tables illustrating the extent of motor truck application in each important field. This latter information is tabulated by states, and by the size of machines employed. To the sales executive these tables represent an authoritative guide to market. They explain market development and illustrate the future possibilities. The progressive, thinking man will find these tables worth a great many times the cost of the entire book.

Bodies

Did you know that there are over 100 different types of motor truck bodies?

The Body Section of the "Reference Book" is the most complete and the most detailed exposition of the types on the market ever presented. You will find illustrations of practically every type, from the simple platform body to the complicated combination elevating and dumping body. The truck chassis dimensions are given in the greatest detail and printed in the most convenient form. The dealer and the manufacturer alike will find continuous profit in the use of this section. It will help **you sell trucks.**

Trailers

Did you know that there are 432 different models of Trailers on the market?

You cannot afford to be without full information concerning this big industry. How and where are all these Trailers used? Is money to be made selling them or manufacturing them? Can the sure profit through their use, and just what are the facts about the economical application of Trailers? The "Reference Book" will give you the facts—the specifications and 20 pages of blue prints of the principal models.

Farm Tractors

Can the motor truck dealer sell tractors and make money? The "Reference Book" presents a clear cut view of this industry. It prints lists of the manufacturers and what they make—the specifications of all models and about 20 pages of blue prints.

The dealer will get a first hand study of power farming—of how the Tractor is applied—how it has increased the farmer's efficiency and reduced his cost of production—it even goes further—it explains the many other uses of the tractor, and unfolds the great sales possibilities that this field offers the automotive dealer. Do you guess—or will you get the facts from the "Reference Book"?

Electric Trucks

What are the developments, the economies, and the future of this type of machine?

The largest individual user of electric trucks in America tells what electric trucks have done in his organization, and presents some interesting facts never before published. The Electric Truck Section contains specifications of all models on the market, blue prints, and the most thorough article on their application ever printed.

Passenger Cars

For the convenience of dealers interested in Passenger Cars, the list of vehicle and parts manufacturers, and the specifications of the various machines on the market, are presented in the most convenient form.

Parts

Over 700 concerns make parts for the manufacturers of the finished trucks, trailers and tractors. The "Reference Book" not only describes the important parts that go into the finished vehicles, but it tells you something about the organizations that make them—the number of employees—the size of the plant—the length of time in business, etc. A powerful sales help, and a useful guide to the purchase of material.

Facts and Figures

How much has production of Motor Trucks increased by years since 1904?

The "Reference Book" contains facts and figures on production, distribution, weights and dimensions of commodities hauled—in fact it presents reliable data on every important phase of the construction, design, application and sale of the product of the industry. It is the indispensable handbook of the progressive element of the trade.

How to get the book

The "Reference Book" is sold only in conjunction with a yearly subscription to the "Power Wagon," the industry's oldest and most progressive trade journal. Each month the "Power Wagon" prints the latest specifications of all motor trucks.

To get the Power Wagon Reference Book simply mail us your check for $5.00. If you are already a subscriber to the Power Wagon, your subscription will be extended for the period of one year from expiration of your present subscription.

Don't be without this valuable service. You may need some of the "Reference Book" information very badly tomorrow. Help us give you maximum service.

Order Yours Today

Power Wagon Publishing Company

544 Lake Shore Drive **Chicago, Illinois**

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PROGRESS

M. P. WINTHER,
President

Mr. Martin P. Winther, President and organizer of the Company, was for several years connected with the Jeffery and Nash Motors Companies. His whole business life having been associated with the automotive industry. It was he who conceived the plan of building the Winther, and the plans and specifications of the truck were made in 1916 in the small building shown on the opposite page. To his ability and untiring energy the success of the Company is largely due.

WM. MARTINSON,
Vice President

Mr. William Martinson, Vice President and Production Manager of the Winther Motor Truck Company, graduated from the Jeffery and Nash plants. Mr. Martinson's whole life has been devoted to mechanics and production, and a visit to the Winther plant is convincing and proves up his ability. The new additions now being made to the plant, shown in illustration No. 4, are under Mr. Martinson's direct supervision. The growth of the Winther has been largely due to his integrity in specifications and carrying them out.

GEO. DRAKE SMITH,
Vice Pres. and Gen. Sales Manager

First connected with the motor truck business with the General Vehicle Co., as salesman and later in charge of agencies. Many years head of commercial vehicle department of the Edison Storage Battery Co. Thoroughly acquainted in the trade. Has more than doubled the output of the Winther in a short time.

THIS is a fitting time for the illustrations on the opposite page—being the anniversary of the production of the first Winther truck—marking the "fourth mile stone" of the marvelous growth of one of Wisconsin's great industries.

The illustrations tell their own story, and the management of the Company is proud of the fact that its product is used so largely in its own state. The old saying that one "is never without honor save in his own country" does not apply to the Winther product for it is used in all parts of Wisconsin with satisfaction to the owners and operators of the trucks.

The Winther plant is situated in an ideal spot near Lake Michigan in the northern part of Kenosha, Wis. The railroad runs alongside of the plant grounds so that the shipping facilities are of the best.

The plant itself is a model of systematized production. Along the railroad siding are eight doors. Various parts of the trucks are unloaded at these doors and put in the stock rooms back of them. The trucks are built on the progressive plan—that is, they are started at one end of the plant and built up as they move along. By the time the truck has gone the full length of the building it is a complete unit from radiator to tail light and from tires to driver's seat.

There is no hauling of materials necessary in this plant. As the truck moves along it is stopped in front of the various stock rooms and the part stored in that room installed. It is just a matter of unloading parts into the room and from there right into the truck. No motions are lost and no time spent in moving heavy materials.

The new addition to the plant, as shown in the last picture on the opposite page, will give twenty-three thousand square feet (23,000) of additional floor space and the added space will enable the Company to double its production; and orders are now on the order books of sufficient size, both for trucks and for the "Winther Six" (the new pleasure car which will shortly be in production) to run both plants for some little time.

Mr. Wm. Hinrichs, Treasurer of the Company, is a man of wide experience in business and finance. He is a director of the Wisconsin Motors Company, one of Wisconsin's largest industries, and can be relied upon as a safe, careful financial executive. He is ably assisted by Mr. H. C. Hagmann and it would take a wide reach to find two more capable men.

Mr. C. T. Abbott, Secretary of the Company, Mr. W. J. Swift, Purchasing Agent, Mr. Harry D. Snyder, Sales and Service, Mr. M. M. Lowe, Sales Promotion, have all had long and valuable experiences and training in their different capacities in the automotive industry, are well known throughout the trade, and respected for their integrity and capabilities.

The other departments are ably headed and all are backed up by as fine a lot of WORKMEN as can be found.

The product is of the best that is possible to build and the progress as illustrated is principally due to the integrity of men, materials and manufacture.

The Winther policy—a square deal for every one—is building up a wonderful company of distributors, dealers, users and salesmen.

The policy is one that deals squarely with the final user of the truck—this Company preferring that the customer or the prospect see what the truck can do at first hand rather than to tell him long winded stories of its possibilities.

The organization of distributors and dealers has been perfected to such a degree that the future business of the Company is well stabilized and at a minimum of expense; and while the product is of the highest type and has to be sold at a corresponding price, the increased production with decreased expenses in many particulars portend to a rapid turnover of capital invested and assure a safe and sound business.

Winther Motor Truck Company

Kenosha, Wisconsin

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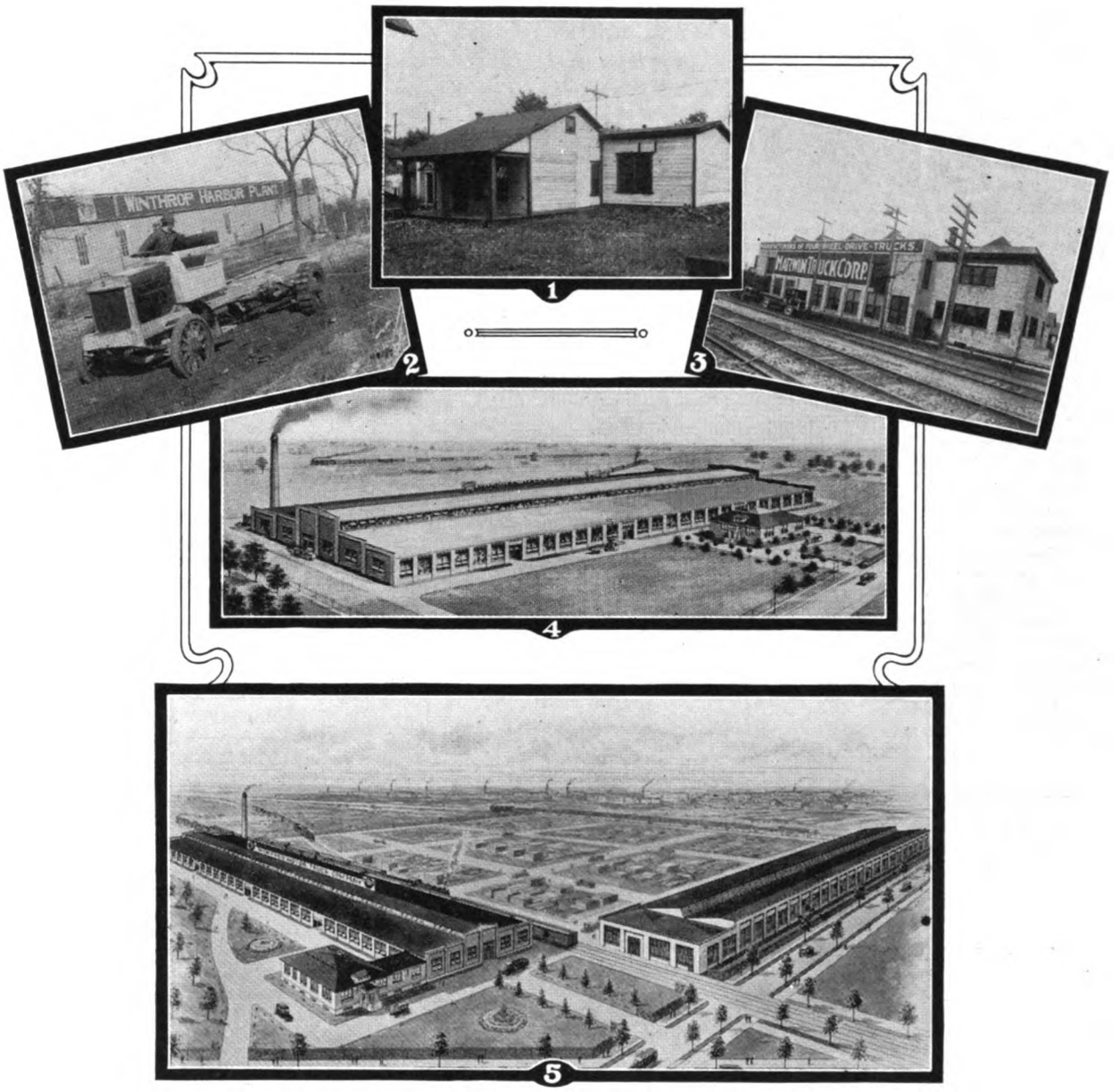

1—Birthplace of the Winther Motor Truck Company, Kenosha, Wis.
2—Winther Plant at Winthrop Harbor, Ill.
3—Winther-Marwin Plant, Kenosha, Wis.
4—Present Winther Plant, Kenosha, Wis., 1920.
5—Present Plant, with the New Addition under construction, Kenosha, Wis.

Winther Motor Truck Company

Kenosha, Wisconsin

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Ferris Trailer Coupler Does Away With One Man and Danger

The Ohio Motor Vehicle Company, of Cleveland, is to manufacture a new device which eliminates the dangers of coupling trailers and motor trucks.

The Ferris safety coupler has a guiding arm which is pivoted on one side of the motor truck at the rear. This guiding arm is of the proper length so that when it is swung inward toward the center of the motor truck, it carries whatever is fastened thereto, directly into the jaws of the coupling. In backing up to the trailer, the driver can stop his machine at any point within 20 inches of the correct coupling position, get out and place the trailer hitch link on the guiding arm, return to his seat, throw on the reverse power and the guiding arm brings the coupling units together, where they are automatically locked. As the lock is made, the guiding arm is thrown from the hitch link and is held back out of the way by a tension coil spring.

With this coupler it is not even necessary to bring the motor truck and trailer in a direct line before the safety arm connection is made. The device allows sufficient latitude so that any average driver can back the machine without difficulty or waste of time to a position where the safety arm connection can be made easily.

The elimination of the danger element in coupling is the outstanding feature of this appliance, but in actual use it has been found to be a remarkable time saver and to do away with the necessity of an extra man.

Free Right-of-Way Favors Truck Against $300,000-a-Mile Railway

With the purchase of a motor truck the owner does not have to consider the cost of the route over which his truck will run. The motor truck owner's right-of-way is free—the only cost to him is that of his license plate, giving him access to as many miles of right-of-way as he wants to cover without being confined to any particular route.

Compare this with a little railroad in the New England states, which although only 13 miles long, cost $4,000,000, or over $300,000 per mile to construct, and you can see why the future of the motor truck as a transportation unit is unlimited.

Trucks May Depopulate Schools

The little red schoolhouse on the hill will be a thing of the past if the bill to be presented in congress to utilize United States mail trucks for transporting children to and from school in the rural district is passed. The object of the bill is to consolidate the educational facilities of the country districts, eliminating many of the schoolhouses and thereby concentrating education in given districts with better schoolhouses, higher paid teachers and consequently better education. This would be brought about, it is argued by adherents of this bill, by bringing the children to the schoolhouse instead of the schoolhouse to the children.

Advisory Council Is to Direct Selden Policies

SALESMEN AND DEALERS TO FORM BODY

The Selden Truck Corporation, in forming the Selden Advisory Council, is taking a long step in order to bring the dealer and the manufacturer closer together.

The Selden Advisory Council will consist of Selden motor truck dealers and salesmen, the representatives being selected from eleven different districts. These representatives must be either dealers, or dealers' salesmen. No member can hold office for longer time than one year.

The council will be a governmental body in reality, the Selden corporation permitting these men from the firing line to come in and give their advice on policies of construction and selling.

To be a representative from a district will be the highest honor that a dealer or a dealer's salesman can expect to have. It will mean being the direct connection between the factory and every dealer and salesman in that territory, on all matters pertaining to the selling of motor trucks. To fill such a big place, is going to mean profits personally, greater than can quickly be grasped.

Other manufacturers have formed somewhat similar organizations, but in every case an official of the company has been in charge of all the meetings and all policies have really been dictated by the company through these officials.

The Selden Advisory Council will meet in Rochester as frequently as is necessary, all expenses being paid by the Selden Truck Corporation, and, while the officers of the company will be ready to confer with the representatives, or to assist them in the meetings, unless they are invited to do so, no officer of the company, from the president down, will be permitted to attend the deliberations. The meetings will be strictly one of Selden dealers and their salesmen.

The first meeting will be held early in the fall, and in order to secure the best representatives possible from the respective districts, it has been decided to hold an election, the primary being held during May and a final election during June. As it is possible for us to make delivery on a 1½-ton model, this will be the method of securing the votes.

During the month of May, every dealer or salesman selling a 1½-ton special will be given a certificate for 500 votes. At the end of the month, the few men holding the greatest number of certificates in each district will be considered as elected by the primaries. Then, the election proper will go on during the month of June, every salesman will have the right to say which one of the two men of his division will receive the benefit of the votes which he can cast by the power of the certificates he holds. Then, at the end of June, the man having the highest number of votes in his division will be called as representative of that division on the Selden Advisory Council.

Road Builder Buys 37 1-Ton Trucks to Replace Heavy Capacity Machines

Henry W. Horst, Rock Island, Ill., road building contractor, has decided in favor of light trucks for hauling sand, cement and other supplies. He has been using both light and heavy machines, but has reached the conclusion that in the long run the former are the most satisfactory and most economical. The order he placed was for thirty-seven 1-ton machines with dump bodies. Although their capacity is small, Horst estimated that the upkeep, speed and economy of operation, more than offset the greater carrying capacity of the 5- to 7-ton motor trucks commonly used for road building purposes. Horst secured the contract for constructing twenty miles of hard roads east of St. Louis along the Vandalia Railroad, a part of the National Trail. Six miles of hard road will be constructed by the same contractor near Clear Lake, Iowa.

International Tour July 14

The International Tour of the Michigan Pike Association will start from Detroit late in the afternoon of July 14 and close there on July 29, after traversing a distance of 1,359 miles. One of the speakers will be A. G. Batchelder, executive chairman of the American Automobile Association. He says of the coming tour:

"I do not know of any other movement that could have such far-reaching results as this tour promises. This tour will serve to bring the people of Michigan and Canada into a closer relationship and will establish a touring habit that will eventually bring into the state thousands of tourists every season."

Of the 1,359 miles to be traversed 574 will be through Michigan and 785 through Ontario. One of the entertainment features of the tour will be the 55-piece band of the Ford Motor Company. And not less distinctive will be the celebrated Ford Motor Company of Canada's Male Quartet, which is declared to be one of the finest vocal organizations in that country.

The organization of the tour is practically complete. It is assured that there will be approximately 350 men in the party, who will travel in about 60 passenger automobiles while 15 motor trucks will carry the equipment. No women are permitted to accompany the tour. Arrangements have been made for a complete history of the tour in motion pictures, which will be exhibited internationally after the close of the tour.

New Representative for Firestone Steel

O. E. Truesdell has been appointed district manufacturers' representative for the Firestone Steel Products Company, at Akron, Ohio. He will take over portions of the territories heretofore handled by L. W. Enos and A. B. Droeger, with headquarters at Chicago and Detroit respectively. His territory will include the states of Ohio and Indiana and he expects to make his headquarters at the Firestone branch at Indianapolis. Truesdell has been three years with this concern, starting in the trade sales department and later working into the manufacturers' sales division at Akron.

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Hub Standardization

By CORNELIUS T. MYERS, M. E.; M. A. S. M. E.; M. S. A. E.

FOR the past year considerable thought has been given to the subject of standardizing axle hub designs, so that the large number of variations of dimensions now in existence can be materially reduced, to the evidently great advantage of all branches of the automobile and motor truck industry. Some particularly active work has been done in the past four or five months, and more or less publicity has been given to the subject. The discussion of this hub standardization very properly embraces passenger car practice in all sizes and motor truck practice in all sizes, covering not only motor trucks equipped with solid tires but also the constantly increasing number of motor trucks equipped with pneumatic tires. It has been estimated, after careful study, that actually millions of dollars are being wasted annually because of the large number of small differences in hub dimensions for various sizes of passenger cars and commercial motor vehicles. Besides the actual waste in dollars and cents, the amount of time and attention wasted in connection with this multiplicity of dimensions could be materially reduced and great delay of energy and patience conserved to better use.

In approaching this problem of standardization we find that to undertake a program that covers the entire field would involve not only an enormous amount of work, but would take a long time to accomplish. It would therefore seem advisable to undertake one branch of this work which would lend itself most easily to standardization, and concentrate our efforts toward obtaining prompt results in this branch, using the experience thus gained to attack the more comprehensive problem. Let us eliminate the passenger car problem for the time being and consider only the motor truck.

IN THE development of the motor truck industry the number of front and rear

In the development of the motor truck industry the number of front and rear axle designs has become quite a large one. Each motor truck manufacturer who built his own axles used individual judgment and preference as to wheel hub details for each size and type of axle. Manufacturers of axles for the motor truck trade have also followed individual preferences as to these details to a very large extent. In reviewing the situation to-day we find that it takes well over 250 different wheel designs to match up with the various axle hub designs and sizes for motor trucks having a total of 10 different load ratings, ranging from ¾ ton to 7½ tons. With the exception of the ¾-ton motor truck, this number of different wheel designs covers only solid tire equipment. The following tabulations were made from data received directly from manufacturers producing front and rear axles for motor trucks, and a study will show the considerable variation of dimensions within comparatively narrow limits.

While it is quite natural that these conditions should exist, due to the fact that designers of axle hubs work independently of one another and to the fact that the manufacturer of wood wheels obligingly conformed to all design variations, it is a condition which the motor truck industry can hardly view with complacency. The large number of motor trucks using these various sizes and the amount of money invested in jigs and tools by the axle and hub manufacturers for producing these sizes offer, of course, considerable resistance to any change.

Now that the pneumatic tire for commercial motor vehicle use calls for practically 50 per centum increase in the number of wheel designs it will be well worth

TABLE I.

Front Axles ¾-Ton

	Kind of Tires	Axle Symbol	Spoke Thickness	Diameters			No. and Diam. Bolts		No. Spokes
				Hub	Flange	Bolt			
Columbia	Pneumatic	5000	1⅜	3⅛	8¼	6½	6	7-16	12
Eaton	Pneumatic	75	1⅜	3⅜	8¼	7⅜	6	7-16	12
Sheldon	Solid	D-260	1⅜	4	7	5 13-16	6	⅜	12
Shuler	Solid and Pneumatic	R. H. 260 L. H. 250	1½	3¼	7	5½	6	?	.....
Standard	Solid and Pneumatic	3070 F	1⅜—1½	4⅛	8	6½	6	7-16	.....
Timken	Solid	1452	1⅜	4⅛	9	6¼	12	⅜	.....
Torbensen	Solid	002 B	1⅜	3⅜	8½	7⅜	6	7-16	.....

Front Axles 1-Ton

	Kind of Tires	Axle Symbol	Spoke Thickness	Diameters			No. and Diam. Bolts		No. Spokes
				Hub	Flange	Bolt			
Sheldon	Solid	33-FA-500	1⅜	4⅛	8⅜	.....	7	7-16	14
Shuler	Solid and Pneumatic	R. H. 320 L. H. 310	1⅜	3⅜	7	5½	6	?	.....
Standard	Solid and Pneumatic	3780 F	1⅜-1⅜	4⅛	8⅜	6¼	6	1-16	.....
Timken	Solid	1520	2	4⅛	9	7¼	12	⅜	.....
Torbensen	Solid	AA2	1⅜	4⅛	8⅜	7⅛	7⅛	7-16	.....

Front Axles 1½-Ton

	Kind of Tires	Axle Symbol	Spoke Thickness	Diameters			No. and Diam. Bolts		No. Spokes
				Hub	Flange	Bolt			
Columbia	Solid	7000	1⅜	4	8¼	6½	7	7-16	14
Sheldon	Solid	D-343	2	5	10¼	⅛	7	⅛	14
Shuler	Solid and Pneumatic	R. H. 360 L. H. 350	2	4	8	6¼	6	?	.....
Standard	Solid and Pneumatic	3780 F	1⅜-1⅜	4⅛	8⅜	6½	6	7-16	.....
Timken	Solid	1520	2	4⅛	9	7¼	12	⅛	.....

Front Axles 2-Ton

	Kind of Tires	Axle Symbol	Spoke Thickness	Diameters			No. and Diam. Bolts		No. Spokes
				Hub	Flange	Bolt			
Sheldon	Solid	D-343	2	5	10¼	.....	7	⅛	14
Shuler	Solid and Pneumatic	R. H. 520 L. H. 510	2	4⅛	9	7⅛	7	?	.....
Standard	Solid and Pneumatic	504	2	4⅛	9⅛	7⅛	6	⅛	.....
Timken	Solid	1540	2	4 5-32	9⅛	6¼	12	⅛	.....
Torbensen	Solid	C C 2 B	2	5	10⅛	9	7	⅛	.....

Front Axles 2½-Ton

	Kind of Tires	Axle Symbol	Spoke Thickness	Diameters			No. and Diam. Bolts		No. Spokes
				Hub	Flange	Bolt			
Columbia	Solid	8500	2	4⅛	9⅛	7⅛	7	⅛	14
Eaton	Solid	250	2	4⅛	10⅛	9	7	⅛	14
Sheldon	Solid	D-370	2	5	10⅛	⅛	7	⅛	14
Shuler	Solid and Pneumatic	R. H. 560 L. H. 550	2	4⅜	10	7⅛	7	?	.....
Standard	Solid and Pneumatic	505	2⅛	4⅛	9⅜	7⅛	6	⅛	.....

Front Axles 3½-Ton

	Kind of Tires	Axle Symbol	Spoke Thickness	Diameters			No. and Diam. Bolts		No. Spokes
				Hub	Flange	Bolt			
Sheldon	Solid	4-F A-20	2⅛	5⅛	11⅛	⅜	7	⅛	14
Shuler	Solid and Pneumatic	R. H. 620 L. H. 610	2⅛	4⅜	10	7⅛	7	?	.....
Standard	Solid and Pneumatic	507	3	5⅛	11⅛	9	7	⅜	.....
Timken	Solid	1630	2⅛	4⅜	10	7⅛	14	⅛	.....

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while to look over this field and see what possibilities of standardization exist. By confining ourselves to front axles for motor trucks operating on pneumatic tires, we can eliminate to a considerable extent the situation outlined above and confine our attention to a comparatively limited field. This can be still further limited by first considering the standardization of axle hubs for woods wheels.

A VERY large percentage of motor trucks are now using, and will doubtless continue to use, wood wheels for service with pneumatic tires, because they are very reasonable in price, their flexibility cushions road vibration and they are amply strong to withstand the stresses imposed upon them. The general proportions of wheels for solid tired motor trucks are well established, and when the wheels are well made of properly seasoned wood they outlast the machine. So far as the design of wheels for pneumatic tired motor trucks is concerned, the problem is, if anything, simpler than for the solid tired vehicle, as road shocks are much better cushioned by the pneumatic tire. This tire also cushions side thrusts on the wheel, due to the turning and bouncing over rough roads. There is one condition, however, under which the side thrust on the wheel might be just as great with pneumatic tires as with solid tires. This is the shock load when a motor truck skids and the felloe of the wheel strikes the curb or other obstruction. This shock load will be transmitted to the wheel bearings, axle housing and shaft, springs, spring hangers, frame and other chassis parts if not cushioned in some way. The tires, of course, do not absorb the terrific blow against the felloe or rim; neither will be the springs be available for absorbing it, as they are designed to flex under vertical impact and do not cushion the side blow. Against these blows, then, the wheel must protect other parts which are more expensive and more difficult to replace. It is this function of protection in which the wood wheel has served to the very great advantage of the automobile and motor truck industry.

Wood wheels act in two ways to protect an automobile or motor truck. In the first place, they are more or less flexible. They give under the dangerous side blows and act as springs to dissipate, to a large extent, those shocks which must otherwise be taken practically metal to metal by bearings, axles, etc. Government tests show that wooden motor truck wheels have from 2 to 3 times the amount of flexibility or springiness of cast steel wheels—a very important consideration in the protection of other chassis parts.

IN THE second place the wood wheel stands in the same relation to the other chassis parts as the fuse plug stands to the wiring and apparatus in an electrical circuit, or a cylinder-head stud in a locomotive steam cylinder—it will break under the excessive side load, due to a bad skid, and in so doing saves the other parts which are more expensive and difficult to repair. For the wood wheel is comparatively cheap and quite easy to replace. Nobody would think of wiring his house and omit blow-out fuses; nor would any master mechanic accept a locomotive in which the cylinder-head studs were so strong that they would not be the first pieces to break in case a slug of water was carried into the steam cylinder and caught between the advancing piston and the cylinder-head.

The two principles just mentioned—that of the cushioning of impact, and the use of an easily replaced weaker link for the protection of the principal mechanism—are

TABLE II.

Rear Axles ¾-Ton

	Kind of Tires	Axle Symbol	Spoke Thickness	Diameters			No. and Diam. Bolts		Brake Drum	
				Hub	Flange	Bolt			Bolt	No. and Size Bolts
Clark	Solid	A S	1¾	.....	7¾	6¾	7	⅝	11¼	7 ⅝
Columbia	Pneumatic	50000	1¾	4 3-16	8¼	6¾	6	7-16	6¾	6 7-16
Eaton	Pneumatic	750	2	2¾	7 7-16	6 3-16	12	7-16	6 3-16	6 7-16
Empire	Pneumatic	B	1¾	3	8	6¼	7	½	6¼	7 ½
Hero	Solid	10	1¾	5	10	8¼	12	⅝	13	6 ⅝
Sheldon	Solid	W-1001	1½	3½	8	6¼	7	½	.....	.....
Standard	Solid and Pneumatic	3070 R	1¼—1¾	2¾	8¼	6¼	6	7-16	6¼	6 7-16
Timken	Solid	6352	2	3	7¾	6¼	12	7-16	.....	.....
Torbensen	Solid	0 X 2 L	1¾	4 1-16	8¼	7¼	12	⅝	12	6 ⅝

Rear Axles 1-Ton

	Kind of Tires	Axle Symbol	Spoke Thickness	Diameters			No. and Diam. Bolts		Brake Drum	
				Hub	Flange	Bolt			Bolt	No. and Size Bolts
Clark	Solid	A W	1¾	.....	7¾	6¼	7	⅝	11¼	7 ⅝
Empire	Pneumatic	L	2	3	9	6¼	7	½	6¼	7 ½
Russel	Solid	P-300	1¾	4¼	9¼	8¼	12	½	8¼	12 ½
Sheldon	Solid	W-1001	1½	3½	8	.....	7	½	.....	.....
Standard	Solid and Pneumatic	602	2	3½	9½	7	6	½	7	6 ½
Torbensen	Solid	A	2	4 1-16	9¼	8¼	14	7-16	13¼	7 ⅝
Wisconsin	Solid	800-G	2	3¼	9	7¼	14	7-16	.....	.....
Timken	Pneumatic	6460	2	4	9	6¼	12	½	.....	.....

Rear Axles 1½-Ton

	Kind of Tires	Axle Symbol	Spoke Thickness	Diameters			No. and Diam. Bolts		Brake Drum	
				Hub	Flange	Bolt			Bolt	No. and Size Bolts
Clark	Solid	1 D	2	.....	8¼	7	7	7-16	13¼	14 ⅝
Columbia	Solid	70000	2	3¼	10¼	8¼	14	7-16	15	7 ⅝
Empire	Pneumatic	N	2	3	9	6¼	7	½	6¼	7 ½
Hero	Solid	15	2¼	5¼	11	9¼	12	7-16	14	6 7-16
Russell	Solid	P-300	2	4¼	9¼	8¼	12	½	8¼	12 ½
Shuler	Solid and Pneumatic	3530	2	4¼	9	7¼	7	?	11	.....
Sheldon	Solid	W-1501	1¾	3¼	8	.....	7	½	.....	.....
Standard	Solid and Pneumatic	603	2¼	3¼	9½	7	6	½	7	6 ½
Torbensen	Solid	B	2	4¼	10¼	9	14	7-16	.....	.....
Wisconsin	Solid	800-H	2	3¼	9	7¼	14	7-16	.....	.....

Rear Axles 2-Ton

	Kind of Tires	Axle Symbol	Spoke Thickness	Diameters			No. and Diam. Bolts		Brake Drum	
				Hub	Flange	Bolt			Bolt	No. and Size Bolts
Clark	Solid	2 D	2¼	.....	9	7¼	7	7-16	15	14 ⅝
Russell	Solid	S-300	2¼	4¼	11¼	10	12	9-16	10	12 9-16
Shuler	Solid and Pneumatic	3570	2	4¼	10	7¼	7	?	.....	.....
Sheldon	Solid	W-103	2	3¼	10¼	.....	7	½	.....	.....
Standard	Solid and Pneumatic	604	2¼	4	10¼	8¼	6	½	8¼	6 ½
Timken	Solid	6560	2¼	5¼	10	8¼	12	½	.....	.....
Torbensen	Solid	C	2¼	5¼	10¾	9	14	½	16	14 ½
Wisconsin	Solid	800-J	2¼	4	10	8	14	7-16	.....	.....

Rear Axles 2½-Ton

	Kind of Tires	Axle Symbol	Spoke Thickness	Diameters			No. and Diam. Bolts		Brake Drum	
				Hub	Flange	Bolt			Bolt	No. and Size Bolts
Eaton	Solid and Pneumatic	2500	2	2¾	7 7-16	6 3-16	12	7-16	171516	12 ⅝
Empire	Pneumatic	0	2½	4	10	8¼	14	½	.....	.....
Hero	Solid	25	2½	5½	11½	10	14	½	13¾	7 ⅝
Russell	Solid	U-300-U01	2½	5½	11½	10	12	9-16	10	12 9-16
Sheldon	Solid	W-21	2½	4	10¼	.....	7	⅝	.....	.....
Standard	Solid and Pneumatic	605	2½	4	10¼	8¼	6	⅝	8¼	6 ⅝
Torbensen	Solid	D	2½	5¾	10¾	9	14	½	.....	.....
Wisconsin	Solid	900-C	2½	4	10¼	9	14	½	.....	.....

Rear Axles 3½-Ton

	Kind of Tires	Axle Symbol	Spoke Thickness	Diameters			No. and Diam. Bolts		Brake Drum	
				Hub	Flange	Bolt			Bolt	No. and Size Bolts
Clark	Solid	3-D	3½	.....	13	9¼	7	½	15	14 ⅝
Hero	Solid	35	3	7	13¼	12	14	½	17	7 ⅝
Sheldon	Solid	W-31	3	4½	12	.....	7	½	.....	.....
Standard	Solid and Pneumatic	607	3½	5	12	10	7	⅝	10	7 ⅝
Timken	Solid	6660	3	7½	13	11	14	9-16	.....	.....
Torbensen	Solid	E	3	7½	13¼	11½	14	⅝	.....	.....
Wisconsin	Solid	900-D	3½	4½	12	10	12	9-16	.....	.....

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universally recognized and practiced. The general public, however, has not appreciated how wood wheels have served them in these respects, though many a big repair bill has been avoided by the fact that an inexpensive wood wheel crushed, and in so doing absorbed the energy of the blow that would otherwise have caused far greater damage. Not only this, but in passenger car service the comparatively slow breaking wood wheel has interposed to change a capsize with possible fatalities into a minor accident. There has been a tendency on the part of the industry, when annoyed by wheel failures, to look for an indestructible wheel, disregarding for the moment, the indispensable service which has been and is rendered by the wood wheel in fulfilling the functions outlined above.

The following table No. 3 outlines some suggestions for standardization for front axle hubs of motor trucks using pneumatic equipment. This tabulation is based on axle load ratings in Column 2, which will correspond to the tire sizes in Column 3. The pneumatic tire has a very definite load limit, beyond which it will not give satisfactory service, and this will prevent over-loading to any extent.

Tire and rim standardization has already been accomplished to a large extent. The rim size will determine the wheel felloe size and in a measure the spoke size. Spoke sizes have been carefully considered with respect to the loads which they have to carry.

Spoke sizes, number of spokes, bore for the hub, the diameter of the outside of the spoke mitre and size of hub bolts all have an intimate bearing on hub design. The tabulation sets forth suggestions for standard practice in this respect. It will be noted that a maximum of 12 spokes is set for these wheels. This number will give ample strength to the wheel and allow easier access to the tire valve. Wheels with 10 spokes are also being investigated, and it is believed will prove very satisfactory for this service. Attention is called to the reduction in sizes of hub bolts used.

Steel wheels of various types demand a further and full consideration. They are being used in increasing numbers, and the hubless types (which seem more popular) should if possible interchange with wood wheel sizes, or be adaptable with slight modification. If this can not be accomplished another set of standards for steel wheels should be considered, so as to minimize the expense in the development of these wheels, and enable the industry to use them when desired.

Doubtless many compromises in hub design are also possible, on axles for solid tired motor trucks. Suggestions for standard practice should be drawn up so that they will be followed in the new designs, even if manufacturers do not at once do what they can to have their present reduction conform to them. Table No. 4 outlines some suggestions.

The writer has been in touch with practically every manufacturer of axles for motor trucks, and the attitude of the vast majority is that of coöperation. Quite a few designs are either about to be put on the market or are in the course of consideration. Some re-designing is undoubtedly contemplated. The subject is of such importance that undoubtedly all parties will coöperate in its advancement to the great benefit of the industry. It is not at all necessary that this be done hurriedly, in fact careful consideration must be given to all phases of the question, but time should not be allowed to pass without continual progress being made toward the solution of the problem.

TABLE III.

Front Axles With Pneumatic Tires

Normal Truck Rating	Load on Tires at Ground	Tire Size	Axle Symbol	Spokes		Diameters			Number and Size of Bolts	
				Number	Thickness	Hub	Flange	Bolt Circle		
½-Ton	1700 lbs.	33 x 4	——	12	1⅛"	4"	8"	.....	6	7-16
1 -Ton	2000 lbs.	34 x 4½	——	12	1¼"	4½"	8½"	.....	6	7-16
1½-Ton	2400 lbs.	34 x 5	——	12	1½"	4½"	9½"	.....	12	7-16
2 -Ton	3000 lbs.	34 x 5	——	12	1½"	4½"	9½"	.....	12	7-16
2½-Ton	3600 lbs.	36 x 6	——	12	2"	5"	10"	.....	12	7-16
3½-Ton	4200 lbs.	36 x 6	——	12	2"	5"	10"	.....	12	7-16
3½-Ton	5800 lbs.	38 x 7	——	12	2½"	5½"	11"	.....	12	7-16

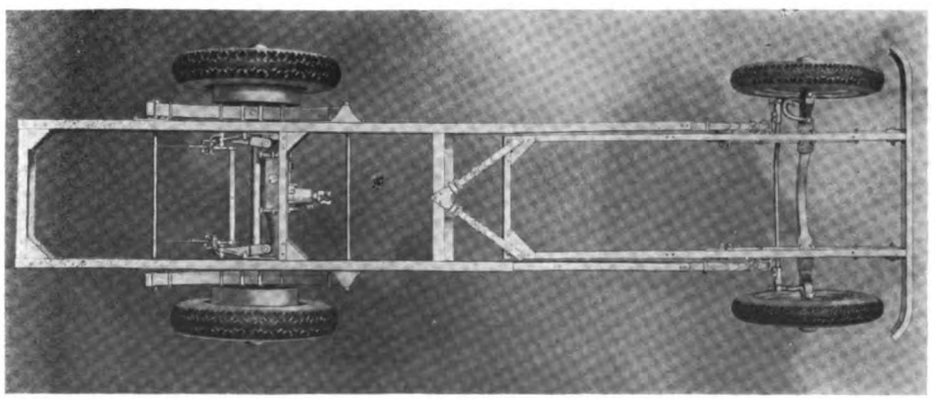
Suggested Standards for Motor Truck Hub Design

	No. of Spokes	Spoke Thickness	Hub Bores	Flange Diameter	No. and Diam. of Bolts		No. of Spokes	Spoke Thickness	Alternate Hub Bores	Alternate Flange Diameter		No. and Diameter of Bolts	
Pneu. ½-Ton Front..	12	1⅛"	4"	8"	6	7-16	Pneu. ½-Ton Rear..	12	1⅛"	3"	4½"	8"	10"	12	7-16
Pneu. 1-Ton Front..	12	1¼"	4½"	8½"	6	7-16	Pneu. 1-Ton Rear..	12	2"	3½"	5"	8"	10"	12	7-16
Solid 1½-Ton Front.	12	2"	4½"	9½"	12	7-16	Solid 1½-Ton Rear.	12	2½"	4"	5½"	9"	10½"	12	7-16
Solid 2½-Ton Front.	12	2½"	5"	10"	12	7-16	Solid 2½-Ton Rear.	14	2½"	4"	5½"	10"	11½"	14	⅞
Solid 3½-Ton Front.	14	2½"	5½"	11"	14	⅞	Solid 3½-Ton Rear.	14	3"	4½"	7½"	12"	13"	14	1
Solid 5 -Ton Front	14	3"	5½"	12"	14	1	Solid 5 -Ton Rear.	16	4"	5"	7½"	13½"	14½"	16	1

New Truck in the Cook

The feature of the 2-ton motor truck manufactured by the Cook Motors Corporation, Kankakee, Illinois, is the easy riding qualities, the cab and power plant being suspended independent of the main frame. This motor truck is rated at 35 miles per hour. It is made with a telescope frame whereby the buyer may have any desired length wheel base within thirty minutes and it is equipped with cab, radiator 25 per centum oversize, Hercules motor, Model CU-3 4 by 5⅛, Cotta, constant mash transmission, Model RU, and Kennedy Model 25 rear axle. Springs are of cromnickle steel throughout with bound Brook oil-less bushings. This job is going on the market at $3,000, with pneumatic tires and electric lights as standard equipment. The company now has five machines ready for the market. The officers of the company are A. E. Cook, of Evanston, president and director; R. W. Sayer, Iowa, treasurer; C. E. Ullrich, Kankakee, secretary; J. H. Mitchell, general manager.

This company likewise manufactures a 2-ton 4-wheel tracking trailer.



New Cook chassis with adjustable frame.

Service Holds Convention

The Sixth Annual Sales Convention of the Service Motor Truck Company was held at Wabash, Indiana, in May. Over three hundred dealers were present, including not only those in this country but many of the foreign distributors as well. Sessions were held in the auditorium on the third floor of the administration building, and meals and banquets were served at the factory dining room.

A daily newspaper was published each day of the convention and was distributed to each delegate in the morning, reviewing the work of the preceding day. In order to have cuts made for the daily paper, photographs taken in the morning were rushed to the nearest engraving plant, forty miles away, at Fort Wayne, by airplane, and cuts brought back in the evening in time for the next day's issue.

Merchandising transportation, instead of selling motor trucks, was the keynote of the convention.

Lyons Now with Sewell Wheel.

James V. Lyons, for the past six years central representative of the American-La France Fire Apparatus Company, Elmira, New York, has resigned to join the Sewell Cushion Wheel Company, Detroit, in the capacity of manager of National Account Division. Mr. Lyons assumed his new duties May 1.

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Aiding the Railroads

American Motor Freight Corporation, Operating Between Philadelphia and New York City, Is Supplementing Railway Service by Carrying 25,000,000 Pounds of Merchandise Annually

ORGANIZED in 1917, the American Motor Freight Corporation has, in two years, found it necessary to more than triple the size of its depots and increase its equipment sevenfold. Beginning with three 5-ton motor trucks, it now has 22 and plans to have 30 in use by June 1. On February 1 it increased its New York City depot from 2,500 to 8,500 square feet and its Philadelphia depot from 4,000 to 50,000 square feet. The corporation employs over 60 mechanics, drivers, accountants, stenographers, and clerks.

The American Motor Freight Corporation, capitalized at $10,000.00, is incorporated under the laws of the State of Pennsylvania. It was organized by two truckmen, who pooled their equipment and interests. The volume of business grew so rapidly that it was found necessary to include three more truckmen, the five now comprising the entire corporation and holding the entire stock issue, one hundred shares. The stockholders have a somewhat unusual arrangement with the corporation in that the equipment, used by the corporation, belongs to the individual stockholders and is under contract with the corporation. This arrangement was devised by the incorporators, who, not knowing how the venture would work out, adopted this plan as a measure of protection.

Each truckmen is paid a flat rate for each round trip. When new equipment is found necessary, each truckman member makes a personal purchase and then contracts his purchase to the corporation. These purchases are made in rotation so that at no time does a stockholder own more than one motor truck in excess of the remaining stockholders. At present each of three stockholders own four motor trucks, while two own five each. Each truckman is permitted to purchase that machine which he considers best.

THE corporation operates but one line—New York to Philadelphia. The machines make no stops to receive or discharge freight at points between termini with the exception of Newark. The company finds so large a volume of business moving between New York and Philadelphia that its equipment is generally fully loaded out of both cities. It is considerably cheaper to move freight between the termini without stops than to interrunt the trip with pick-ups or deliveries. The company offers a regular express service to shippers. Shipments are collected and delivered by service cars, which act as feeders to the large motor trucks. Through machines travel at night via the Lincoln Highway, arriving at the depot in the morning. They are reloaded in the afternoon and that night return to their point of origin. At present the corporation has nine motor trucks traveling each way each night. Four motor wagons are held in reserve for repair and emergency work. Trips are made daily except Sunday.

At the Philadelphia depot the corporation has a complete service station. Motor trucks are overhauled and repaired regularly, the work on each being charged to its owner. The service station is operated like an independent business.

The company is now shipping merchandise at the rate of 80 tons a day or about 25,000,000 pounds a year. This at an average rate of $1.00 per hundred pounds means means a gross revenue of $250,000.

IN A period of less than two years the corporation has been able to reduce its rates 36 per centum while railway express rates have increased almost 28 per centum. When the company was first started it charged $1.25 a hundred pounds, while the railway express charged $.90. Now the minimum motor truck rate is $.80 a hundred-weight, while the railway express rate is $1.15. When motor truck rates are first compared with less-than-carlot freight shipments they seem excessive, but upon analysis are found to approximate each other. At present the first-class freight rate for less-than-carlot shipment is $.33 a hundred pounds. But to equalize the service, carting charges, at points of origin and delivery, must be added. At $.15 a hundredweight, a low cartage charge, this would amount to $.30, thus bringing the freight cost up to $.63. In making a comparison one must not forget the advantages of motor service, which is many cases are of greater value than the difference in rates.

Merchandise shipped from either terminal depot is delivered to the consignee the *following day*. Railway express shipments take *at least two days* and sometimes a week before being delivered to the consignee. Less-than-carlot freight takes a *minimum of three days* and frequently as long as twenty-one days to cover the same distance. During the two recent heavy snowstorms, the motor trucks were unable to travel for only three days; before and since then the service has been uninterrupted.

About 50 per centum of the goods hauled is in fresh beef, chemicals, cloth and paints; the other 50 per centum being composed of a list of several hundred commodities. Some time ago the company was successful in closing a contract with the Victor Talking Machine Company, whereby it transports all photographs and records shipped from the Camden, New Jersey, plant for distribution from New York City.

Shippers, at first, were skeptical as to the possibilities of motor transportation especially to points one hundred or more miles away. The traffic manager of a certain paint concern when first approached by the motor corporation's solicitor could not see how shipping by motor truck could even approximate the economy of freight. A few weeks later the paint concern received a rush order and decided to send it via motor truck. Since then all its shipments to Philadelphia have been carried by motor truck. The traffic manager has found that instead of using heavy, expensive wooden containers he can use fiber containers, which are not only lighter and less expensive, but which also require less labor. He has calculated that it is cheaper to ship by motor truck than by railroad freight when he adds to the freight rate, the costs of hauling to and from the railroad at points of origin and delivery, the difference in cost of material and labor between wooden and fiber containers, and the more expeditious service he can render his firm's customers. This traffic manager is only one of many hundreds that have and are finding motor truck shipping economical.

WHEN first organized the corporation found it necessary to employ a number of business solicitors for it had great difficulty in securing enough merchandise for solid loads. Now the corporation has more business than it can handle with its 22 power wagons. Recently, John H. Jacobs, the corporation's New York City representative said: "The limits of our business are boundless. We are outgrowing our depots and equipment at a tremendous rate. Every day we add new shippers to our already large list, these shippers are coming to us voluntarily. Our business is now so far in excess of our equipment that we expect to add eight more motor trucks in the next few months. There is considerable talk about the railroads raising their freight rates at least 20 per centum, which if done will mean a rate of $.40 a hundredweight for first-class freight between New York and Philadelphia. This will cause an enormous increase in motor truck shipping between these cities, for all transportation costs considered the motor truck will be able to function more ecenomically than the railroad. Our policy has been to reduce rates whenever possible. While I can not state authoritatively that our present rates will be reduced, I do know that they will not be increased."

Among the many advantages that have been cited by shippers, in favor of motor transportation are:

1. Closed vans, which are locked while the motor truck is in transit, assure the shipper that his merchandise will be received by the consignee. Railroad freight cars, while lying in yards awaiting unloading are more or less unguarded. If the value of the merchandise stolen from such cars in any one year were computed it would run into the millions of dollars.

(Continued on page 70.)

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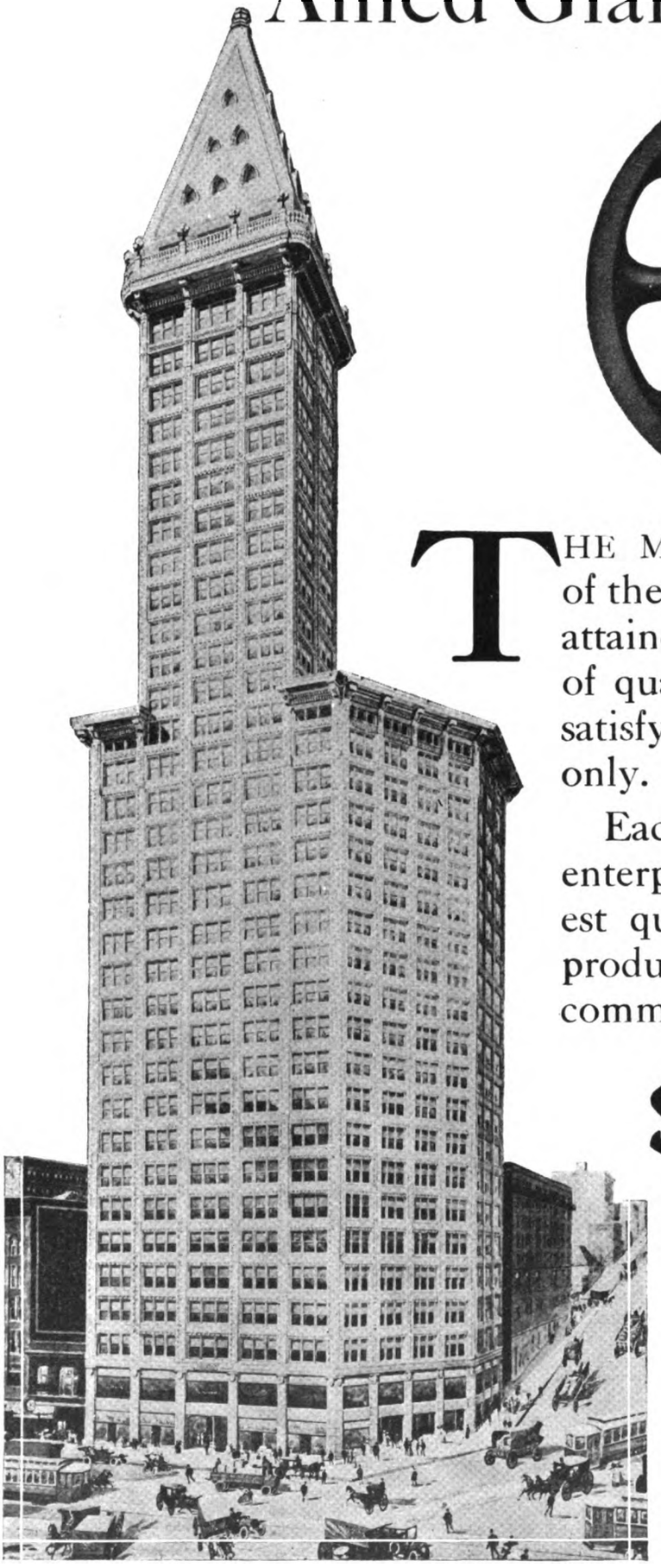
Allied Giants In Success



THE MANUFACTURING SUCCESSES of the Smiths, since 1845, have been attained solely through superiority of quality and design, to meet and satisfy a demand for THE BEST only.

Each and every Smith industrial enterprise has turned out the highest quality of product possible to produce, and sold it at a reasonable commercial price.

Smith Wheels

"EVERLASTING"

are THE BEST for Trucks, Tractors and Trailers. Their quality makes them such.

They can be depended upon at all times, for all time.

They are guaranteed, without limit—FOREVER!

42-STORY L. C. SMITH BUILDING, SEATTLE

SMITH WHEEL INC., SYRACUSE

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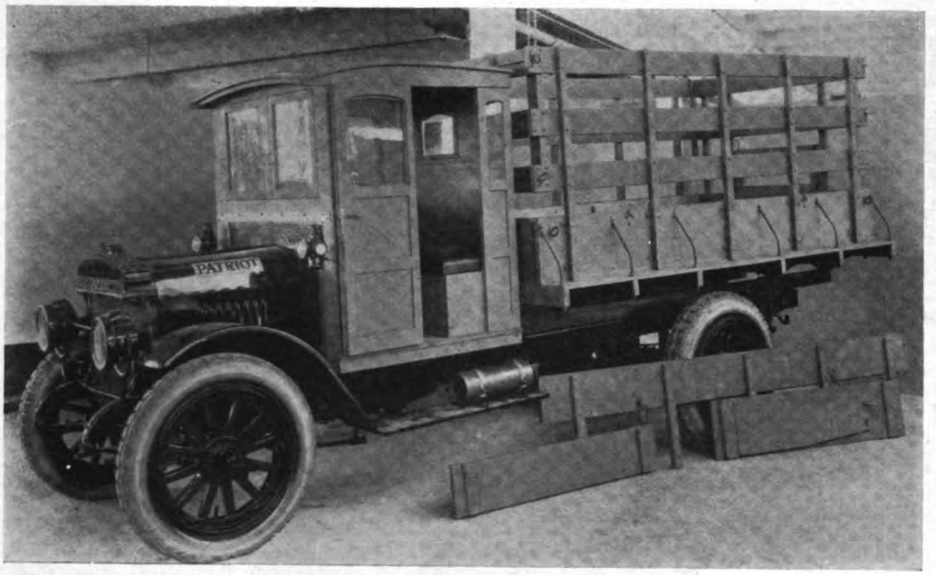


Patriot combination farm body.

Aiding the Railways.

(*Continued from page 68.*)

2. Motor trucks offer shipper to consignee service in 24 hours, which is 24 or more hours better than similar service by any other transportation agency.

3. Misshipments are eliminated. Merchandise consigned to a certain point is placed on a motor truck bound for that point, so that the shipment can not be misdirected or sent to a foreign point. A misdirected shipment means a delayed shipment. It frequently occurs that a merchant, who finds his stock exhausted before a second shipment can reach him, will substitute that which he has or can get without delay.

4. Goods arrive in excellent condition. Merchandise, especially perishable merchandise, such as beef or produce, rapidly loses much of its market value. To command the highest market prices it is necessary they be in prime condition. Rapid delivery is a very important factor in the handling of such goods, for the sooner they can be placed on the market after leaving the point of origin, the higher the price they will bring. Unless a shipment is strongly crated and carefully packed, it may arrive in poor condition, while if shipped by motor truck, crating need not be heavy and delivery is made in good condition.

Hauled 30,000 Feet of Logs Over Snow and Ice-Sheathed Roads

Up in the snows around Petoskey, Michigan, a Duplex 4-wheel drive was in almost constant operation throughout one of the worst winters in that section of the country. In fact, since early in October up to date the motor truck has lost less than a week's time, and this through no fault of the motor truck itself. For eight months it has been saw logging, operating over ice-covered roads and under adverse conditions generally in Harry Taylor's camp, east of Petoskey.

Between the time the motor truck first went into service and the time of the first snowfall, the logs were handled on a Fruehauf semi-trailer. An average of over 3,000 feet was hauled per trip. The machine made ten trips per day.

Snow and consequent icy roads naturally slowed up operations somewhat, but under the mode of travel adopted more than 30,000 feet was hauled daily over roads that teams could not work at all.

The road over which the motor truck worked was ice-covered and needed to be sprinkled—which meant overtime for the Duplex. A Blackmer rotary pump was installed on the motor truck, and at night—when the Duplex had finished its regular work of hauling logs—it was hitched to the sprinkler and sprinkled the road ready for the next day's operations.

Body Service with Oshkosh

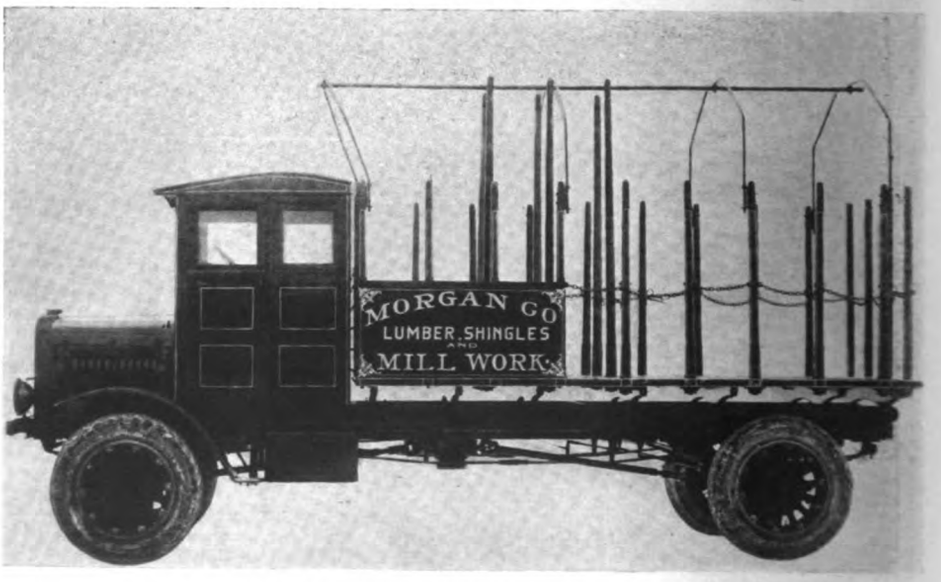
Not only are Oshkosh 4-wheel-drives delivered to the buyer completely equipped, ready for the addition of the body, but unusually valuable assistance is given in helping the buyer secure the right body for his needs. This is due to the fortunate condition that located in the same city with the Oshkosh Motor Truck Manufacturing Company is a high class body factory of national reputation. Standard or special bodies are built under the personal supervision of the motor truck manufacturers and the service of expert designers and estimators is readily available. Close association with the body maker permits prompt attention to the matter. The accompanying illustration shows an Oshkosh 4-wheel-drive model AA 2-ton motor truck with standard high stake body and poles for top covering, which is of heavy waterproof duck. This is one of the most serviceable of the many available types of bodies. Dozens of other body designs are pictured and described in a new catalog just published, copy of which is offered to any one interested enough to write.

Improved Combination Farm Body

The Patriot Motors Company, of Lincoln, Nebraska, have recently placed a new type body on the market to meet the special needs of the agricultural trade. This body is of the combination stock and grain type of especially heavy construction. The bottom panel is 14 inches high, being built solid to the bed. The stock rack which is 50 inches high is constructed to be lifted off by one man, either in sections or as a unit, to be replaced by a 10-inch grain panel, thus forming a solid grain body. The stock rack is also equipped with hog gate in the rear which can be entirely removed if desired. The sills and subsills of the combination body are constructed entirely of heavy kiln-dried oak, while the panels are built of yellow poplar. This body is built in various lengths to fit trucks of all capacities and is 60 inches in width.

Plows 130 Acres in Four Days and a Half.

Warren Klett, a farmer of near Plainfield, Illinois, plowed 130 acres in four days and a half. Work was kept up continuously between Monday night and Saturday noon with the exception of Tuesday night, when showers forced a suspension. Klett handled the tractor, a Bates Steel Mule, during the day time and his assistant, Russell Hartong, during the night. By the use of a tractor and the double shift the field was made ready for corn seeding in ample time and long ahead of neighboring farmers who depended upon their horses alone.



New body equipment for Oshkosh 4-wheel drive.

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Adaptable—

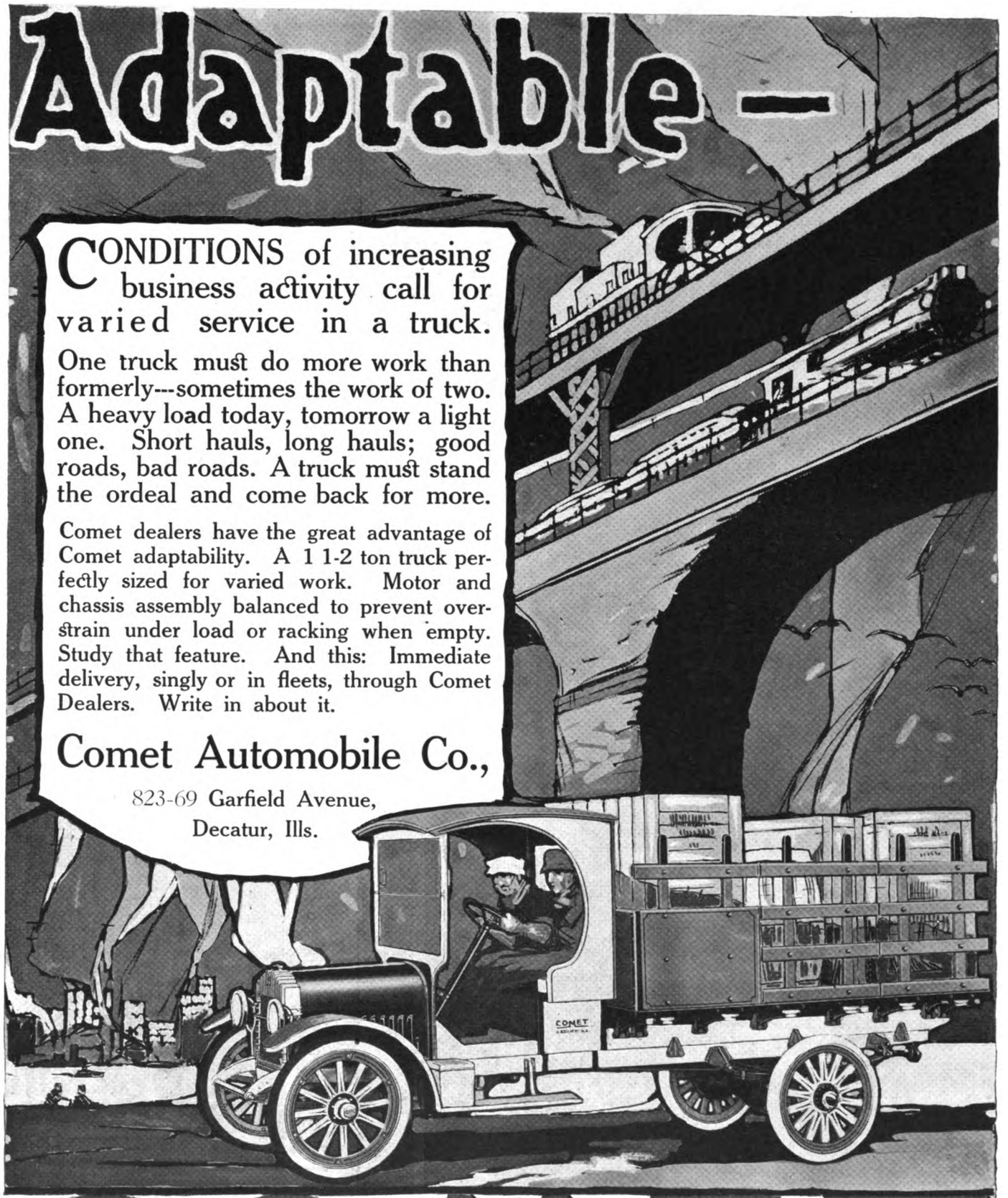
CONDITIONS of increasing business activity call for varied service in a truck.

One truck must do more work than formerly---sometimes the work of two. A heavy load today, tomorrow a light one. Short hauls, long hauls; good roads, bad roads. A truck must stand the ordeal and come back for more.

Comet dealers have the great advantage of Comet adaptability. A 1 1-2 ton truck perfectly sized for varied work. Motor and chassis assembly balanced to prevent overstrain under load or racking when empty. Study that feature. And this: Immediate delivery, singly or in fleets, through Comet Dealers. Write in about it.

Comet Automobile Co.,

823-69 Garfield Avenue,
Decatur, Ills.



COMET

1½ TON

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Trucks Save Farms From Flood

The value of a motor truck in an emergency was never better illustrated than on April 26 when floods threatened to destroy the levee protecting the Spring Lake farming district. It was necessary to secure 25,000 cement sacks to be filled with sand and earth to protect the embankment crumbling. These sacks were located in various sections of Central Illinois and a fleet of motor trucks was utilized for the purpose of collecting them. One of these, an Oneida, owned by Murray & Medbery of Bloomington, made the run with 3,000 sacks, weighting 2 tons, from Bloomington to Manito, 60 miles, in 3 hours and 10 minutes, moving over poor roads, rough in many places and interspersed with mud holes. This performance demonstrates that with decent highways and motor truck equipment, the United States could be made immune from serious effect upon business due to railroad strikes.

Knowles With Sanford In the South

G. M. Knowles was appointed March 15 as southern division sales manager for the Sanford Motor Truck Company, and is making his headquarters temporarily at Baltimore. Mr. Knowles was originally with the Packard Motor Car Company, Detroit, spending approximately two years in its service. Later he was connected with the A. L. Englander Company of Cleveland, and assisted in its success in establishing Acme motor trucks in Cleveland. In recent months he had been connected with a dealer organization in the southeast, handling Armleder motor trucks.

Roberts in Charge of Stewart Sales.

Edward K. Roberts, for several years with the Bush Manufacturing Company, of Hartford, and previous to that with the Locomobile Company, has been made general sales manager of the Stewart Motor Corporation. Chas. C. Craig, former general sales manager, has been promoted. He is now assistant to the president and will look after the outside interests of the management. Announcement is also made that production has increased 260 per cent for the first three months of this year over the corresponding period of last year.

Newby Heads Bethlehem Sales

H. F. Harris, president of Bethlehem Motors Corporation, at Allentown, Pennsylvania, announces the appointment of Charles R. Newby as general sales manager. The 1920 Bethlehem production schedule carries an increase of 275 per centum over 1919. There is over $1,300,000 being spent for building and equipment to care for this increased production. When the additions have been completed, the total capacity of the plant will be in excess of 20,000 vehicles.

Graham New Denby Sales Manager

L. B. Graham, of Chicago, Illinois, has been appointed general sales manager of the Denby Motor Truck Company, Detroit. Mr. Graham was formerly wholesale distributer for Apperson Brothers Automobile Company, Kokomo, Indiana, with headquarters in Chicago.

Mr. Graham is now on an extended tour of the country, visiting a number of Denby distributing points.

Crean Made Assistant to Collier President

H. J. Crean, assistant secretary-treasurer of Fisher-Wilkie, Ltd., of Sandwich, Ontario, has been appointed assistant to the president of The Collier Motor Truck Company, Bellevue, Ohio, and will assume his new duties at once.

Big Snow Prolongs Horses' Stay in Denver Streets

SENTIMENT SAVES HIM FROM BANISHMENT

DENVER, COLO., MAY 18.—Doom stalks with the horse in the streets of Denver. The end is not yet, but it is nearing; for Dobbin has been summoned before the powers that be to show cause for continuing to exist as an economic factor of the city's civic and commercial welfare. And whereas he has not been relegated, he has been brought to realize that his career is closing.

On March 22 City Councilman Theodore H. Proske introduced to the councilmanic body an ordinance providing that horses should be prohibited from the streets and all other places within the corporate limits of the city, after January 1, 1925, and imposing a fine ranging from $10 to $100 for violation of the provision.

April 17 the most severe blizzard and snowstorm in the history of Colorado descended upon Denver and left her snowbound for five days. Tramway traffic ceased. Motor cars and motor trucks made little progress through the streets blocked with two to four feet of snow. But old Dobbin got on the job with carts and crews of shovelers, and the streets were cleared.

When Proske's ordinance came up for final consideration in the city council April 20, various councilmen delivered themselves of considerable oratory, more or less tinged with touching sentiment, and the horse received much deserved praise for the valuable part he played in readjusting traffic to the normal trend. And Proske's ordinance was defeated. But the seed of discontent has been sown, and traffic troubles are still troubling. It is the consensus of opinion among fire and police officials, civic and commercial organizations, and the motor public, generaly, that our faithful friend, the horse, has been granted only a brief respite.

Denver is a city of approximately 263,000 population, according to the unofficial census returns. There are in Denver some 26,293 motor cars, motorcycles and motor trucks; one automotive vehicle to each ten of population. During the tourist season—from May to October—state highway officials estimate that the total number of motor vehicles in Denver averages 50,000.

Denver's total area is 60 square miles. Her streets in the downtown section are 40 feet wide from curb to curb. The main business section of the city is contained in 80 blocks, being 5 blocks wide and 16 blocks long. The boulevards and avenues vary in width from 60 to 80 feet. Broadway, which traverses the city north and south, is 100 feet wide.

Now, 50,000 automotive vehicles plying busily hither and yon in an area of 60 square miles are more or less crowded. Especially are they crowded in the downtown section, in 40-foot streets, where the tramway cars are thickest. Moreover, the zone parking system in vogue in the downtown section for the parking of automobiles does not tend to relieve the traffic congestion. In some of the cross streets in the downtown section automobiles are parked in the center of the streets; in others they are parked along the curbs at an acute angle to the curb line. In the main thoroughfares, all of which are traversed by tram lines, they are parked parallel to the curbs.

It is not impossible to imagine the difficulties of dray horses in streets where such a parking system prevails and where there is a steady stream of automobiles and motor trucks. In the cross streets, where cars are parked centerwise, there is only room enough for vehicles to proceed in single file on either side of the parking space. Where cars are parked along the curbs, there is no space to spare between the two streams of traffic which flow past each other from morning until night. It has been said on competent authority that the traffic policemen in Denver work harder and have less fun than those of any other city in the country.

Horse lovers in Denver have long since abandoned the exhilerating pastime of driving their steeds in the parks and boulevards. They seek the unfrequented thoroughfares. In fact, they are rarely seen anywhere in the city limits.

The horse, in fact, is not popular as a means of locomotion here, particularly in commercial and industrial pursuits. His place has been filled by light delivery trucks by all the department stores and grocery firms. He has been retired from the fire and police departments. Even the street cleaning department has become motorized. Practically all the moving vans are motor trucks, and horse drays of all kinds are rapidly being replaced with automotive equipment.

The horse is doomed to exclusion from Denver, sooner or later. Another ordinance will be initiated another day, perhaps when the weather is finer, say in July or August, of some unusually warm summer. And if, by any chance, the elements of traffic congestion should be wholly ignored, he will be doomed to exclusion in the interest of health and cleanliness. For Denver prides herself in the possession of the cleanest streets in any city in the United States, and she will maintain that pride.

London Police Adopt Motor Prison Vans

After lagging many years behind the police of provincial cities, the Metropolitan police has decided to replace its horse-drawn prison vans or "Black Marias" by motor vehicles. The change, which is to be made at an early date, is expected to result in considerable saving of expense.

CLASSIFIED ADVERTISING

FOR SALE — By the Kentucky Lumber Company, Burnside, Ky. 2—Wickes Patent Vertical Water Tube Boilers, 250 H. P. each, 150 lbs. pressure; arch top, Dutch oven fronts and all necessary valves and fittings.

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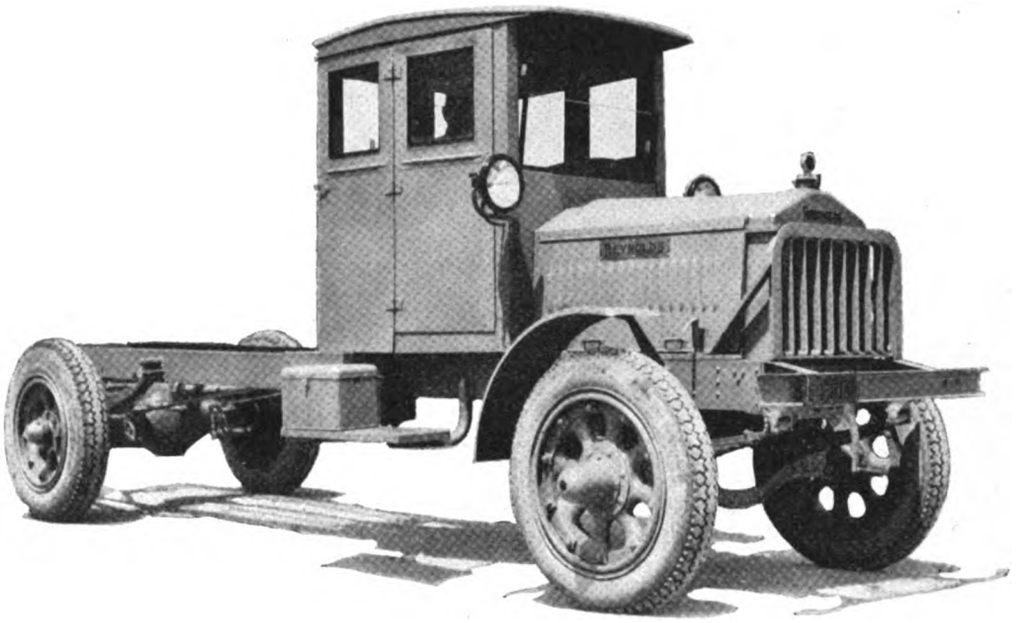

REYNOLDS

1½-2 Ton Pneumatic Tired Express Model

Highest Quality Truck in America and the Only one Fully Equipped

Built in all sizes up to 5 tons

Distributors accustomed to handling a high grade article are offered Desirable territory and the Right kind of co-operation.

Reynolds Motor Truck Company
Mt. Clemens, Mich.

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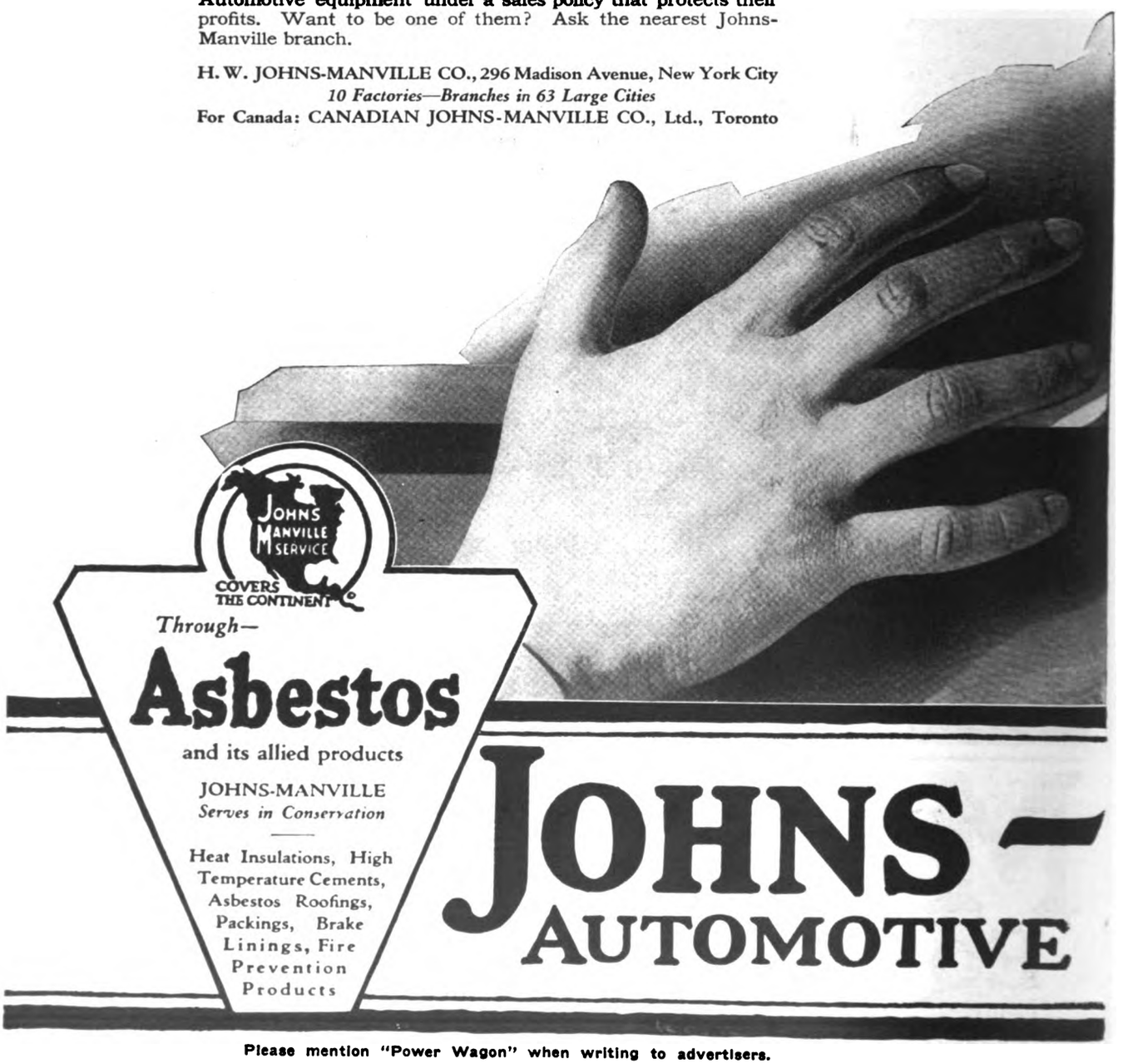
Another sale!
You can't keep them on your shelves

MEN who are always on the lookout for *quick sellers* push Johns-Manville products. They keep the Johns-Manville Hub Odometer on display. They go after the truck and commercial car owners—and they make sales. It doesn't take long to attach this accurate, mileage recording instrument and there's a mighty good profit in it.

These up-to-date dealers also keep an eye on their customers' brakes. They tell their customers when their brakes need relining and they sell them Johns-Manville Non-Burn Asbestos Brake Lining. They know it will give entire satisfaction, because it is Johns-Manville Asbestos from mine to brake.

All over the country these dealers are selling Johns-Manville Automotive equipment under a sales policy that protects their profits. Want to be one of them? Ask the nearest Johns-Manville branch.

H. W. JOHNS-MANVILLE CO., 296 Madison Avenue, New York City
10 Factories—Branches in 63 Large Cities
For Canada: CANADIAN JOHNS-MANVILLE CO., Ltd., Toronto



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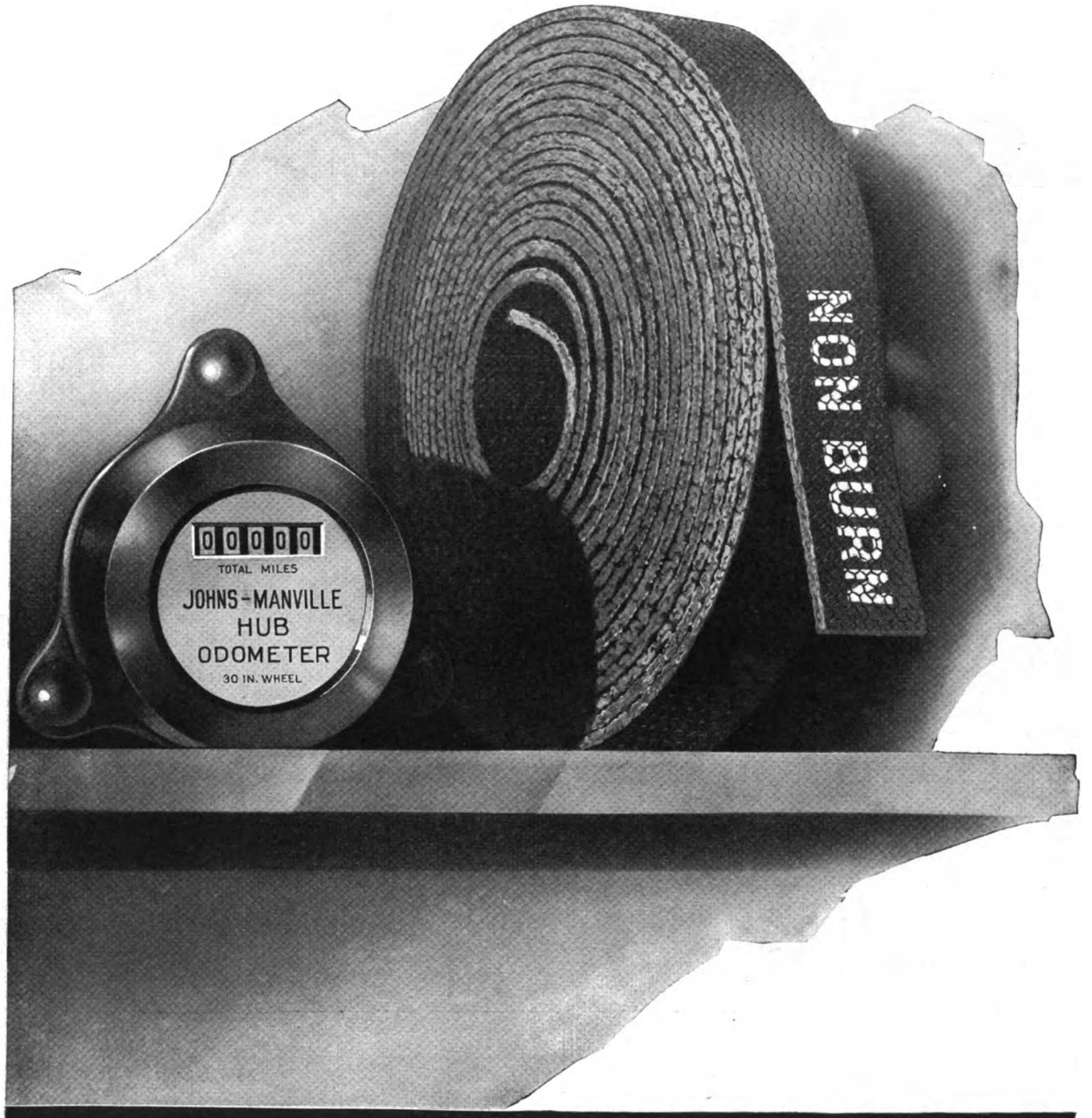

MANVILLE
EQUIPMENT

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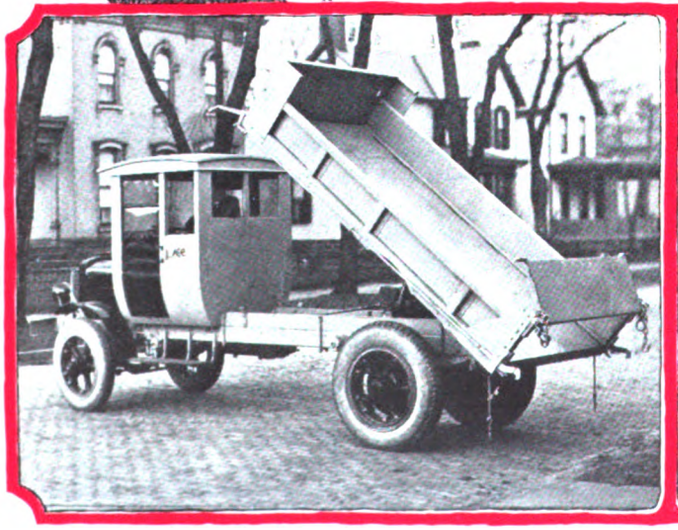
ACE
MOTOR TRUCKS



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versatile

Ace versatility extends even to its selling plan which recognizes the Dealer as a partner; helps h'm; protects him; pays him well. A brand new plan which fits the Truck business as it is best done today.

Ace versatility recognizes obstacles of service through overcoming them.

There isn't a load or a road or a traffic condition that does not yield readily to this Truck's ability to play any Transportation part.

Versatility is engineered in—it comes from wonderful flexibility—perfect balance—direct driving power—straightness of frame, drive shaft and control rods to insure positive action—ease of control—completeness of all essentials which keep a Truck moving in spite of anything.

Specifications

Modine Spirex Sectional Radiator
Timken-Detroit or Sheldon Front Axel
Buda Motor
Atwater-Kent Distributor
Merchant & Evans Multiple Dry Disc Clutch
Cotta Transmission
Cotta Control
Ross Steering Gear
Merchant & Evans Universal Joints
Timken-David Brown Worm Drive or Sheldon Rear Axel
Mather Springs
Parish & Bingham Frame
Dayton Steel Wheels (on 2½ ton model)
Schwarz Wooden Wheels (on 1½ ton model)
Firestone Solid Tires or Goodyear Pneumatic Tires

Extra Standard Equipment

All Weather Cab
Military Radiator Guard
Channel Steel Bumper
Westinghouse Self-Starter
Westinghouse Generator
Self-Tracking Electric Lights with Dimmers
Exide Battery
Klaxon Horn
Pierce Governor
Veeder Odometer
Fully Painted

Completeness Assures Versatility Plus

A strong, rugged and perfectly equipped haulage unit ready for your job whatever it is—that's the Ace.

Consider the efficiency and economy of a dependable Electric Self-Starter; the advantage, morning and night, of self-tracking electric headlights; the protection from all weathers of a good cab; the benefits of a governor which minimizes road strains through control of engine speed; the added durability of all parts from three full coats of paint.

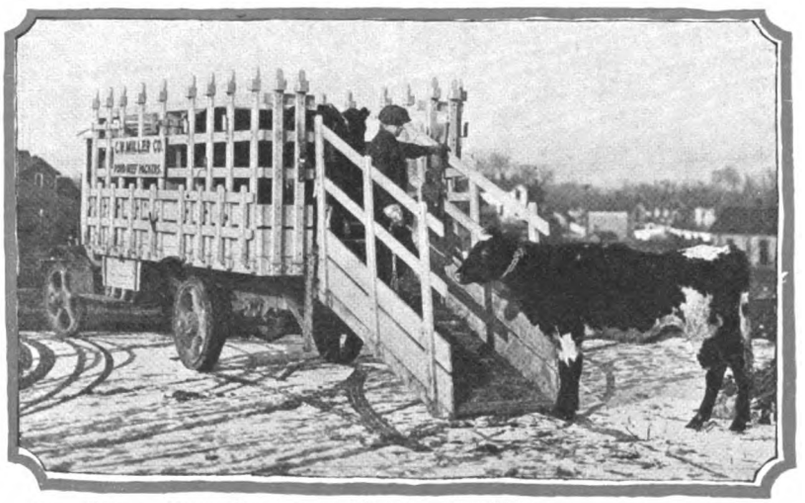
Versatility is a matter of all 'round usefulness—look to the Ace for it.

Ace

The AMERICAN MOTOR TRUCK COMPANY
NEWARK OHIO.

PRICES

1½-ton Standard	$3100.00
1½-ton Pneumatic	3450.00
2½-ton Standard	3800.00
2½-ton Pneumatic	4250.00
2½-ton 144" Wheel Base - -	3800.00
2½-ton 180" Wheel Base Solid Tires	3950.00
2½-ton 180" Wheel Base Pneumatic	4400.00
3½-ton Standard	4500.00
3½-ton Pneumatic	5150.00
3½-ton Long Wheel Base - -	4650.00
3½-ton Long Wheel Base Pneumatic	5250.00



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FOR truck and tractor service the continuous fin tubular type of radiator core is unreservedly favored by the McCord engineering department.

Summed up, the reasons are that this type of core possesses tremendous strength, resistance to blows, light weight, provides unimpeded circulation of large volume of air, thorough dissipation of heat and is easy to repair in case of accident.

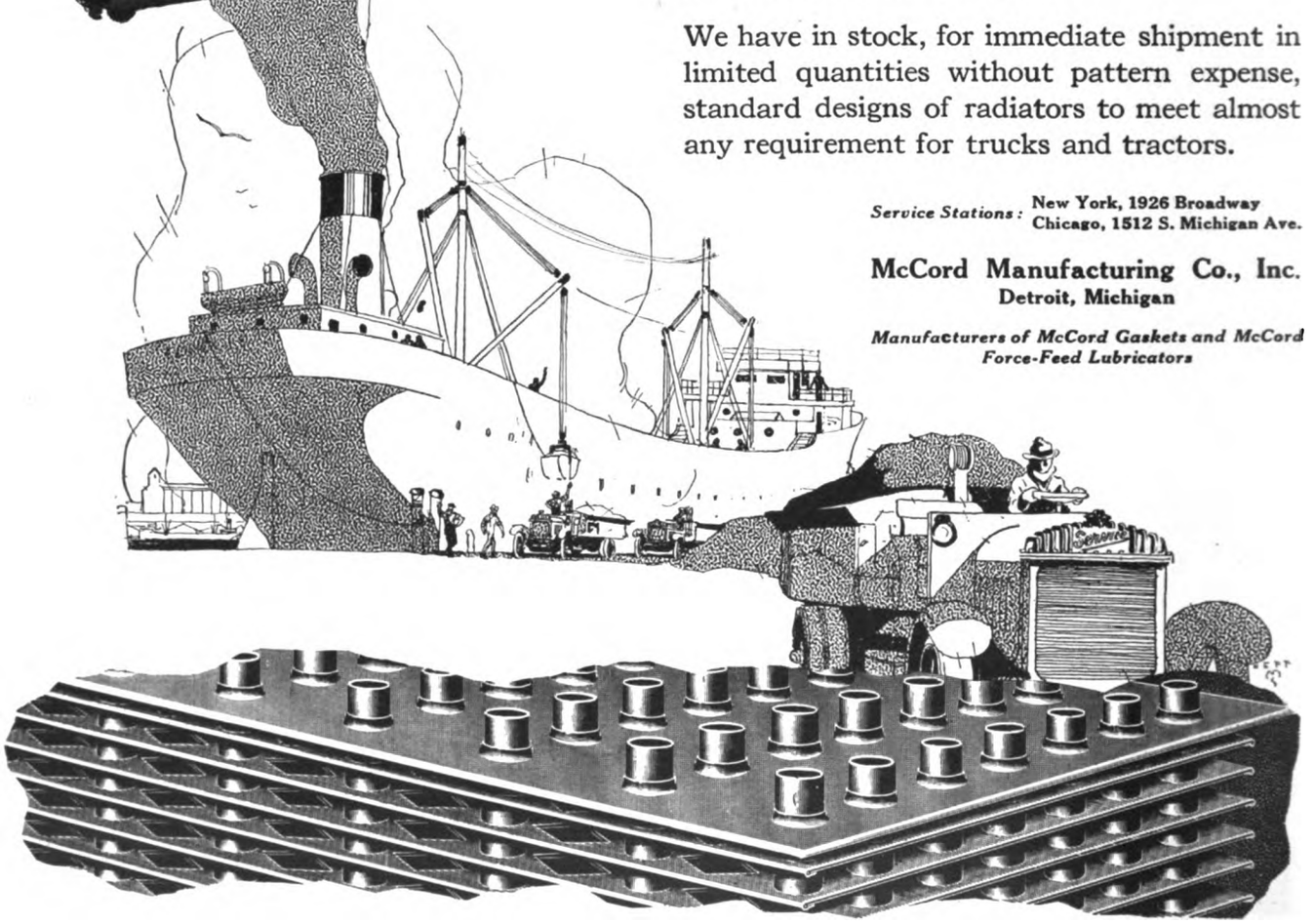
Years of experience and exhaustive tests of all types of radiators furnish unquestionable evidence of its superiority. While all types of radiators, both tubular and cellular, are manufactured by this company, there is no hesitancy in recommending the continuous fin tubular type for trucks and tractors.

We have in stock, for immediate shipment in limited quantities without pattern expense, standard designs of radiators to meet almost any requirement for trucks and tractors.

Service Stations: New York, 1926 Broadway
Chicago, 1512 S. Michigan Ave.

McCord Manufacturing Co., Inc.
Detroit, Michigan

Manufacturers of McCord Gaskets and McCord Force-Feed Lubricators



McCord
RADIATORS

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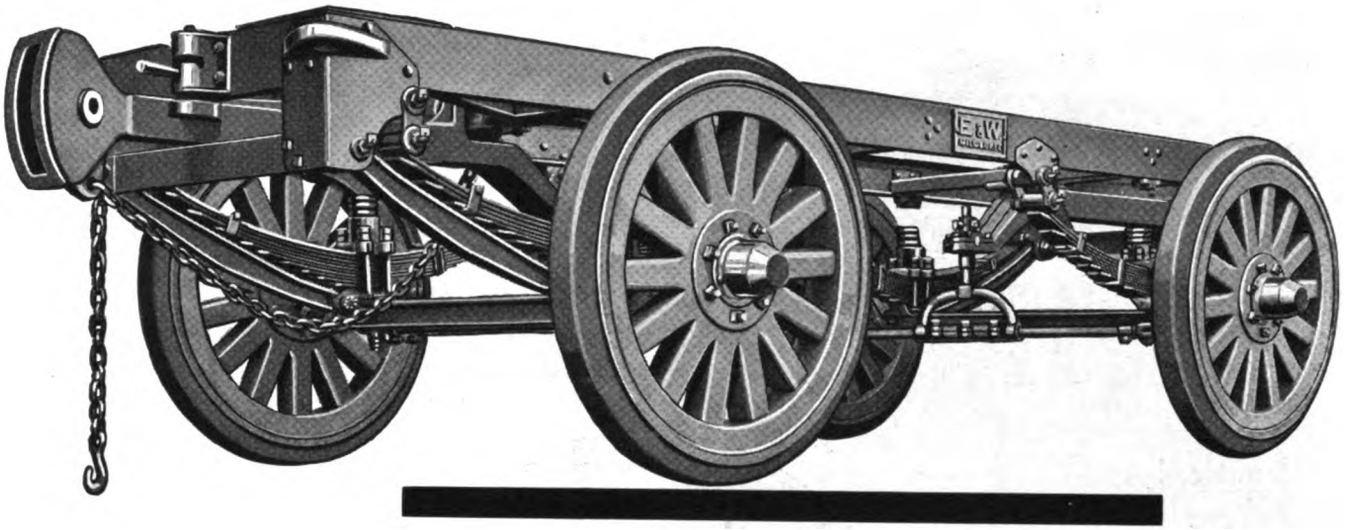

The greatest trailer value on the market

The E. & W. Trailer is equipped with radius rods that relieve the springs—also ***prevent the trailer from side-swinging and snaking.*** And the E. & W. direct draw bar pull further insures ***true tracking.***

The E. & W. Trailer is not a drag on the truck's power, and will carry full load at full truck speed without straining the motor.

There are other ***built-in*** reasons why the E. & W. is the greatest trailer value on the market. Write now for details.

2½, 3½, 5-TON, Reversible Types
Note Sturdiness of Materials and Design

DEALERS—Write now for attractive arrangement for your territory.

E. & W. Company
Manufacturer
MILWAUKEE, WISCONSIN, U. S. A.

E. & W. Truck Units

make a truck from any passenger car. Not a makeshift, but a 100% truck. 18 styles, 1 to 5-TON, internal gear and worm drive. Fully illustrated descriptive literature sent on request. Write now.

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Universal

Steel Cushioned Wheels

HUBLESS FULL FLOATING

Mead Cushioned Wheels

TRUCK WHEELS

A Practical Wheel for Trucks, Tractors and Trailers

Simple in Construction

Mechanically Correct in Construction

Vibrations and Hammer Thrusts from Road Contact are Absorbed in the Wheel

The Wheel Designed with a Knowledge of Traffic Conditions

This Wheel Excels in Resiliency, Efficiency, Durability and Economy.

Reduces Gasoline Expense 25%

Reduces General Upkeep Expense More than 50%

Protects the Engine and Chassis against Crystallization

A Practical Wheel for Any Truck on Any Road with Any Load

This Wheel Meets the Growing Demand of Truck Users for Reducing Upkeep, and for Protection from Engine, Tire and Chassis Troubles.

A Wheel With Perfect Drawbar Pull

This Wheel Rides with the Resiliency of Pneumatic Tires and is not injured by Oils, Acids, Salts or Other Chemicals, because the Rubber is fully protected.

Initial Investment Compensated by Reduced Aftercost Plus Upkeep

PITTSBURGH TRUCK WHEEL CORPORATION

General Offices: 405 Fulton Building

PITTSBURGH, PA.

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A Nationally Advertised Truck

The reduced facsimile reproductions of 13 full page advertisements in the Saturday Evening Post, appearing during the last twelve months, represent but a part of the publicity behind Wilson trucks.

Every Wilson dealer benefits from this campaign of national advertising.

It is a guarantee to the buying public that here is a factory which believes in cooperating with its dealers.

Are You Selling an Unadvertised Truck?

Don't you really think the time, energy and money expended on account of an unknown product would be much more profitable when put back of a nationally advertised motor truck?

We have some valuable territory still unassigned and can make attractive dealer contracts to such men or organizations as meet our requirements.

Better get in touch with us at once

J. C. WILSON COMPANY
Detroit, Mich.

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ECONOMY

In Motor Truck Transportation Means

TRAILERS

Automotive Trailers are built to deliver **"Service."** We ask and expect your business on the basis of the Service they will give in constant use. Our line consists of a size and type for every trade.

"THE FREIGHT CAR OF THE HIGHWAY"

will reduce hauling costs.

Write for full information and prices. Tell us how we can best co-operate to your mutual advantage.

Automotive Trailer Corporation

1442 McCormick Building

CHICAGO

Factory: **Kincaid, Illinois**

Please mention "Power Wagon" when writing to advertisers.

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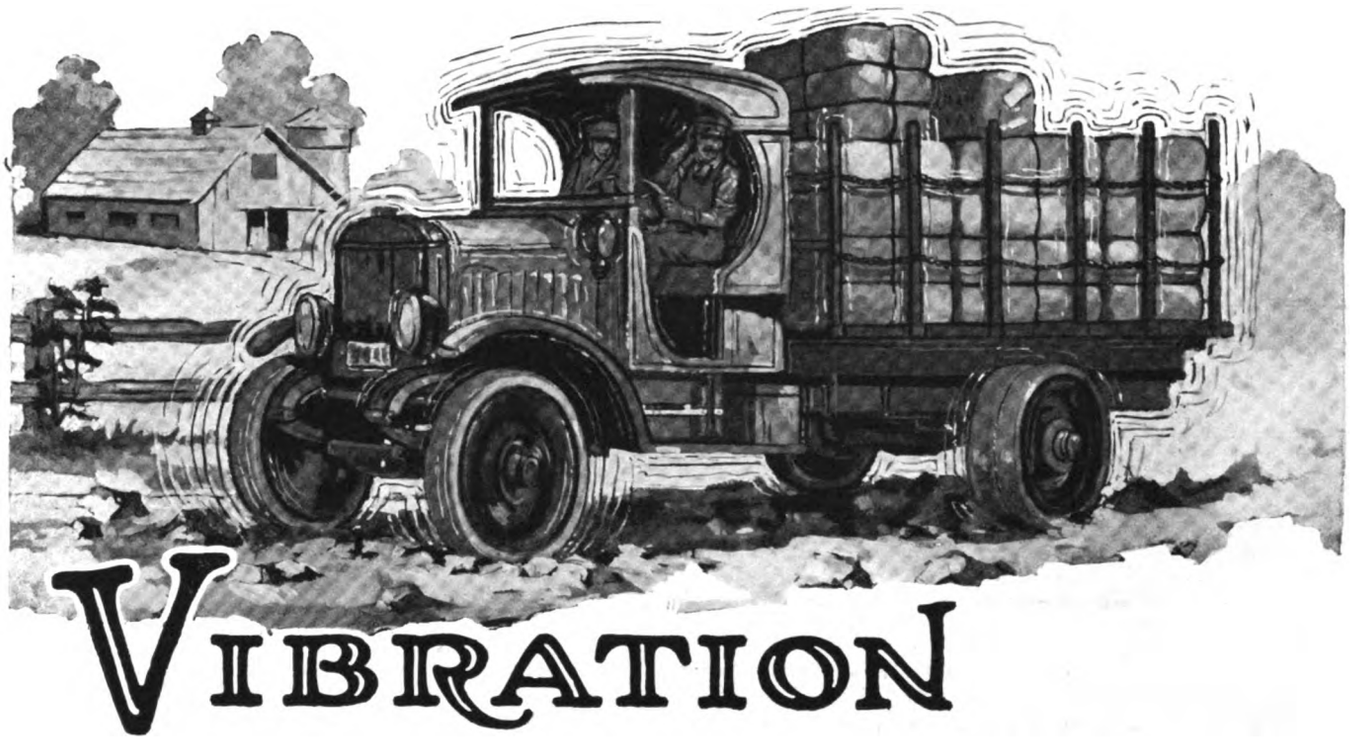
THE ELECTRIC STORAGE BATTERY CO.



VIBRATION

That's what is occurring in every inch of your truck. And that's the reason no *ordinary* storage battery can "stand the gaff" of this service.

Play safe now. Equip with the

"Exide" Starting & Lighting Truck Battery

The battery that was especially designed and constructed to withstand the terrific shock and vibration of service on the Army Tanks

This battery embodies every qualification essential to a battery for solid-tired motor trucks.

It is strong, powerful, dependable and enduring; able to meet every demand and to keep on meeting them.

Behind it is the 32 years' experience of the *largest* manufacturer of storage batteries in the world.

It is the *one* battery that will improve your service and cut down expense.

Details on request at our nearest sales office.

THE ELECTRIC STORAGE BATTERY CO.

1888 PHILADELPHIA, PA. 1920

New York Boston Chicago Washington Denver San Francisco St. Louis
Minneapolis Cleveland Atlanta Kansas City Pittsburgh Detroit Rochester

Special Canadian Representatives, Charles E. Goad Engineering Co., Limited, Toronto and Montreal

"Exide," "Hycap-Exide," "Ironclad-Exide," "Thin-Exide," "Chloride Accumulator"

Batteries are made by this Company for every storage battery purpose

THE ELECTRIC STORAGE BATTERY CO.

Please mention "Power Wagon" when writing to advertisers.

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INVESTMENT—
Pure and Simple

THE substantial merits in International Motor Truck design and construction have made themselves known over the length and breadth of this country. Wherever traffic and commerce have reached, the steady swing toward International haulage tells its story.

International Motor Trucks

are working in steady, unspectacular fashion for scores of the largest and best known industrial enterprises in the United States, as well as for many thousands of small firms and individuals. The record and the backing of this line of trucks have made International Motor Truck purchase a matter of *unquestioned investment.*

The era of motor transportation is young. Hundreds of the best and biggest dealers of a few years hence have not yet begun. International Motor Trucks are among the few leaders now in total sales. Capacities range from ¾-ton to 3½-ton. The future for International truck and dealer is one of undoubted success. Write the address below for all the facts in regard to this line of motor trucks—the completeness of International service—the details as to dealer terms, territory, etc.

Motor Truck Department

INTERNATIONAL HARVESTER COMPANY
Of America
(Incorporated)
CHICAGO **U S A**

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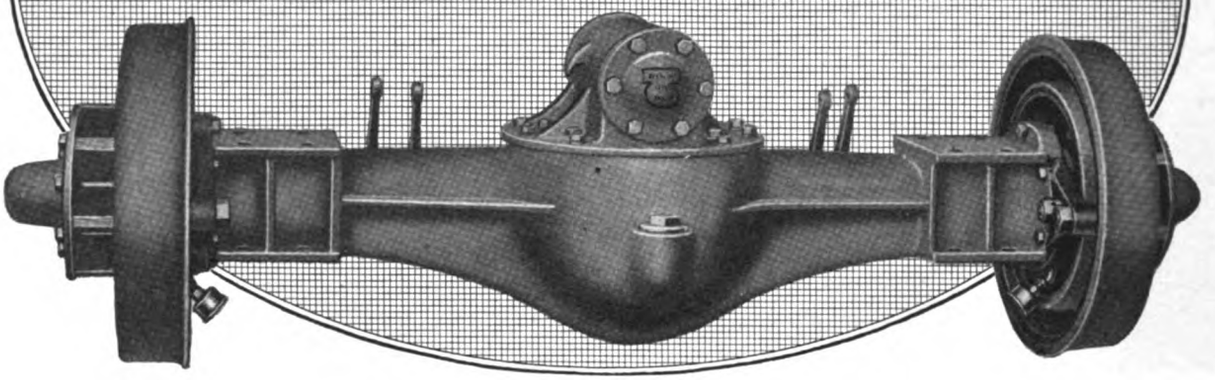
WISCONSIN AXLES



Wisconsin Axle Brake Construction

The concentric brake construction of Wisconsin Axles with separate brake drums for the service and emergency brakes permits the two sets to be used simultaneously or alternately, thus materially reducing the heating.

Because of the double felt retainers, oil cannot possibly reach the service brakes. They are kept clean and dry under all conditions.

With the concentric arrangement, the width of the brake drum is cut in half which permits the mounting of the wheels that much nearer the load.

These are only a few of the features which make Wisconsin Axles stronger and more durable.

WISCONSIN PARTS CO.

OSHKOSH, WISCONSIN

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DAY-ELDER
Worm-Drive Motor Trucks

Model A
1-1½ tons Capacity Including Weight of Body 3500 Pounds
$1995

Model B
1½-2 tons Capacity Including Weight of Body 4500 Pounds
$2300

Model D
2-2½ tons Capacity Including Weight of Body 6000 Pounds
$2750

Model C
2½-3 tons Capacity Including Weight of Body 7000 Pounds
$2950

Model F
3½-4 tons Capacity Including Weight of Body 9000 Pounds
$3700

Model E
5-6 tons Capacity Including Weight of Body 14,000 Pounds
$4600

Clearly and Emphatically, The DOMINATING Value

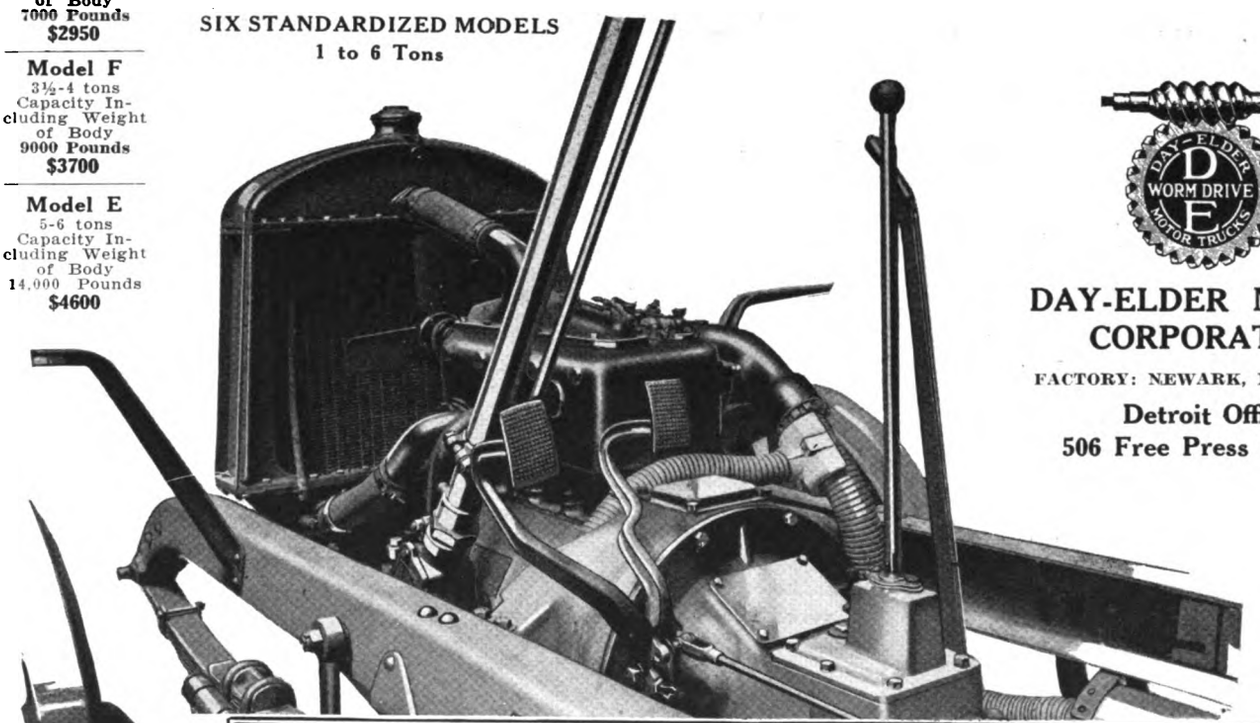
From a humble beginning, DAY-ELDER trucks have gradually forged to the front, until today they are reckoned as a factor in the industry and the dominating value among all worm-drive motor trucks.

Today they are a familiar sight on the highways of commerce the world over. The sun never sets on them.

The world-wide recognition which they have attained could never have been won in any other way except by producing a truck which was fundamentally correct in design and construction, embodying none but the finest materials and built to render the limit of service at the minimum of maintenance cost.

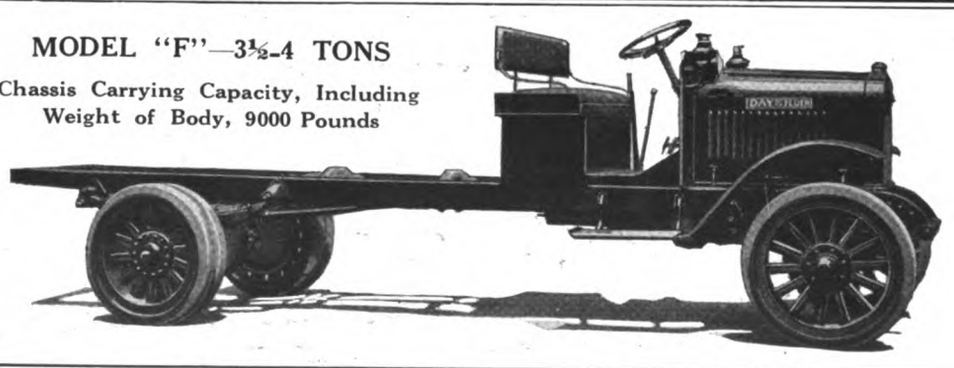
If that is the kind of a truck you want to SELL, communicate with us. Our dealer proposition is most liberal and our service all that you could desire.

SIX STANDARDIZED MODELS
1 to 6 Tons



DAY-ELDER MOTORS CORPORATION
FACTORY: NEWARK, N. J., U. S. A.
Detroit Office:
506 Free Press Building

MODEL "F"—3½-4 TONS
Chassis Carrying Capacity, Including Weight of Body, 9000 Pounds



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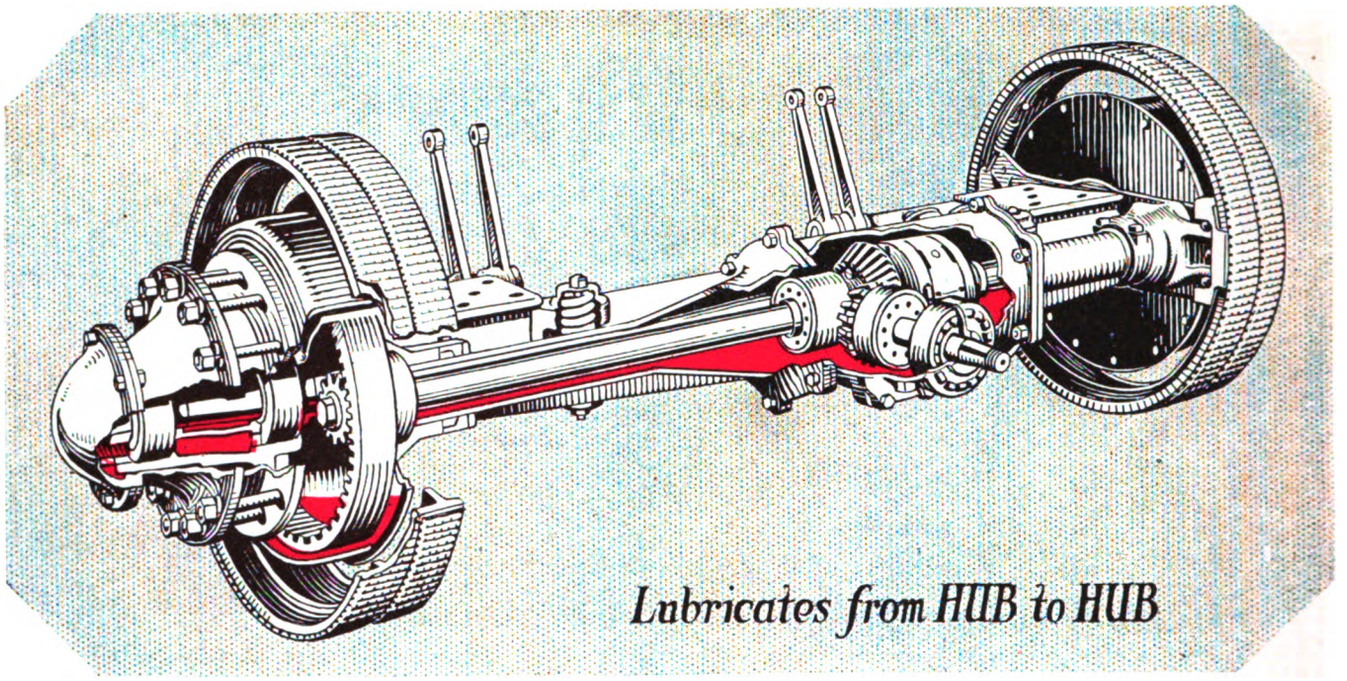

The Most Perfectly Lubricated Internal Gear Axle in the World

Kennedy supremacy in rear axle construction for motor trucks is due not only to quality but to a basic design that provides perfect lubrication.

Each moving surface is reached and all gears run in a drenching bath of oil, insuring smooth performance—and *tremendously prolonged life.*

Kennedy axles are more than 95 per cent built in the Kennedy shops.

1 ton 1½ ton 2½ ton 3½ ton

Write for technical literature showing fifteen good reasons for Kennedy efficiency

THE HERO MANUFACTURING COMPANY

Incorporated 1883 **Philadelphia, Pa.**

Kennedy INTERNAL GEAR axles

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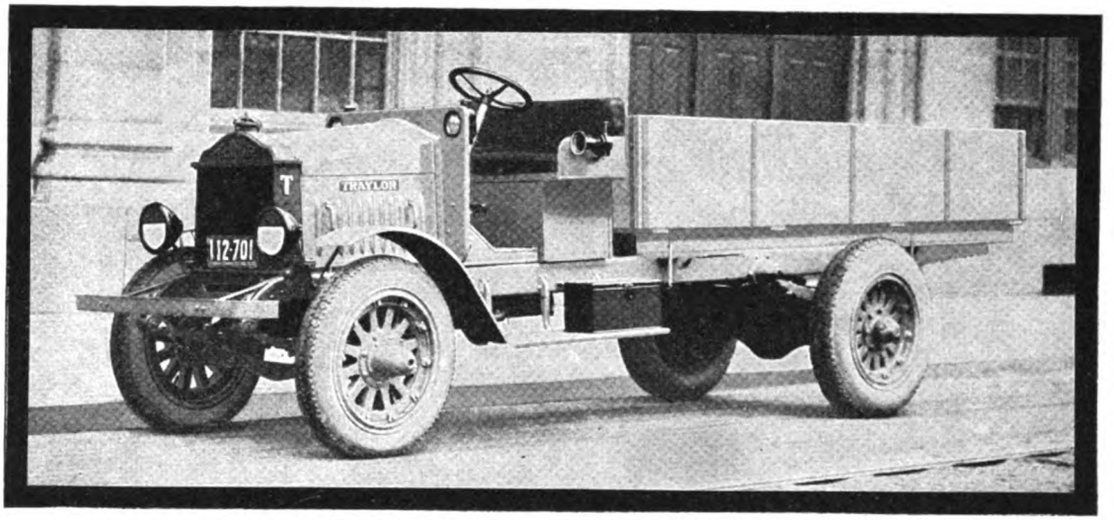
TRAYLOR



TRAYLOR TRUCK

From basic design to final assembly Traylor Trucks are backed by the judgment of the distinguished Traylor engineering staff. Absolute manufacturing perfection is vouched for by the tremendous prestige and unlimited resources of the organization.

Correspondence invited from responsible dealers

TRAYLOR ENGINEERING & MANUFACTURING COMPANY

"PRODUCTS OF AN OLD ORGANIZATION"

TRUCK AND TRACTOR DIVISION
CORNWELLS, PA. [35 MINUTES FROM PHILA.]

MOTOR TRUCKS & FARM TRACTORS

Please mention "Power Wagon" when writing to advertisers.

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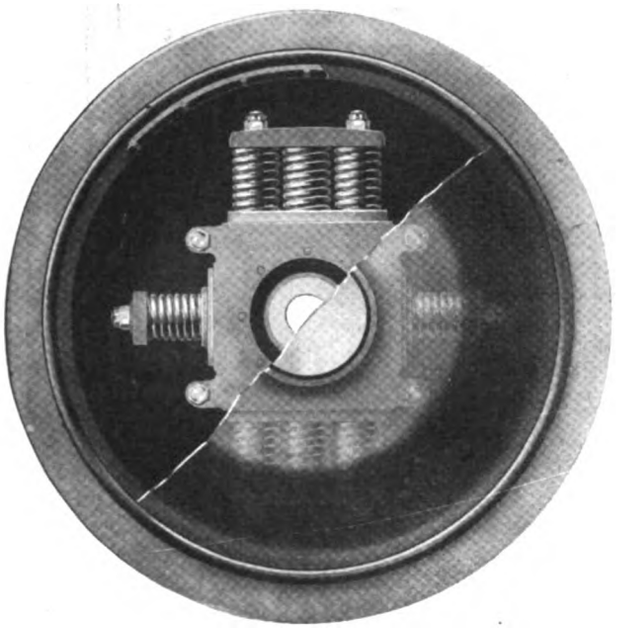
The Cornfield Resilient Wheel

Pneumatic Results—And More—With Solid Tires

Stop the Disintegrating Pound on Solid Tires and Make Them Equal to Pneumatic Tires



The spring action is on the axle Springs do not revolve with wheel

Solid truck tires wear very slowly from road abrasion, but they pound to pieces very rapidly. Every time they hit an obstruction, the weight of the truck and load multiplies the force of the blow. Solid tires alone cannot equal pneumatic tires either in cushioning effect for the chassis, or in mileage, but when used with Cornfield Resilient Wheels, pneumatic results may be obtained with solid tires.

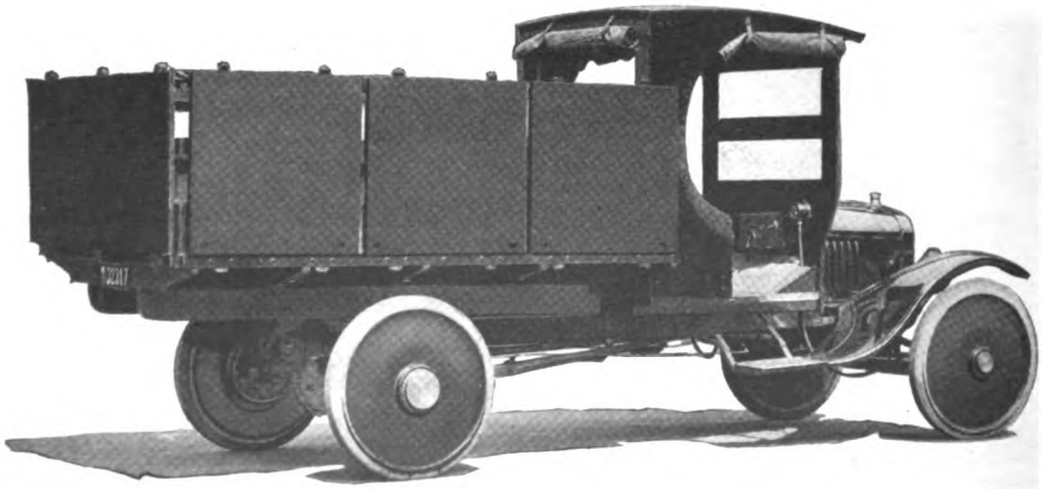
Cornfield Resilient Wheels Prevent the Pounding on the Tires and Make the Truck Ride as Smoothly as Though Running on Pneumatic Tires

The spiral springs within Cornfield Resilient Wheels absorb the road shocks. The springs act directly on the driving axle, floating it. They obtain results mechanically that heretofore have only been possible with pneumatic tires.

Cornfield Resilient Wheels Are Now Made in Full Sets for Ford One-Ton and Other Light Trucks

Look into the principles of these wonderful wheels. You will see why automotive engineers have pronounced them the **"perfected truck wheel."**

The Cornfield Wheel Co., Inc., Anna Place, Detroit, Mich.



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"The derrick broke, dropping the steel girder on the Warner Trailer"

WARNER MANUFACTURING CO.
Beloit, Wisconsin

February 9, 1920

Gentlemen:-

On February 7th, 1920, your representative furnished us a B-30 Warner Trailer 5½-ton capacity to be demonstrated to us for the purpose of convincing our firm that a Warner Trailer would solve a number of hauling problems.

Your 5½-ton pipe trailer coupled to a 4-wheel drive truck carrying a steel girder which was 42'6" long, weighing 24,200 lbs., to the new Federal Reserve Bank of Dallas, was being raised off the truck and trailer by a big steel derrick and while the girder was suspended in the air one and one-half feet above the truck and trailer, the derrick broke, dropping this girder on the Warner Trailer which equaled a dropping weight, of that distance, around 48,400 lbs. Mr. W. M. Boatman, driver of the truck states after the accident happened, that there was absolutely no damage done to the truck or trailer in any way and we wish to tell you that this certainly convinces our firm that the stability of the Warner Trailer is beyond our expectation.

It took exactly three quarters of an hour for loading and delivering this girder.

Yours very truly,

MOSHER MANUFACTURING CO.

per Ford Hicks

FH-VC

The above photograph illustrates an incident which is perhaps the most severe test to which any trailer has been put. The Warner Trailer sustained the shock of the steel girder falling on it, without being broken. This represented a dropping weight of *48,400 pounds.*

Read the accompanying letter and if you have a hauling problem let us show you how to cut your expense in half. There is a WARNER TRAILER for every purpose.

THE WARNER MANUFACTURING CO.
26 Main Street, Beloit, Wisconsin

WARNER
HEAVY-DUTY
TRUCK TRAILERS
TWO AND FOUR WHEEL TYPES

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MR MARLIN-ROCKWELL INDUSTRIES MR

SRB

Single Row Double Row

ANNULAR BALL BEARINGS

BALL Bearings must be of finer steel, more accurately machined and capable of more critical duty than any other part of an automobile, truck, tractor or other mechanism demanding anti-friction bearings. Yet they do their work hidden away from sight; they must serve without attention or adjustment, yet be permanently proof against failure.

All the more reason why manufacturers of automobiles, trucks and tractors should use bearings of S. R. B. quality.

S. R. B. Ball Bearings and S. R. B. Taper Roller Bearings are used in those motor cars, trucks and tractors, whose names are instantly thought of as leaders in their respective fields.

STANDARD STEEL AND BEARINGS INCORPORATED

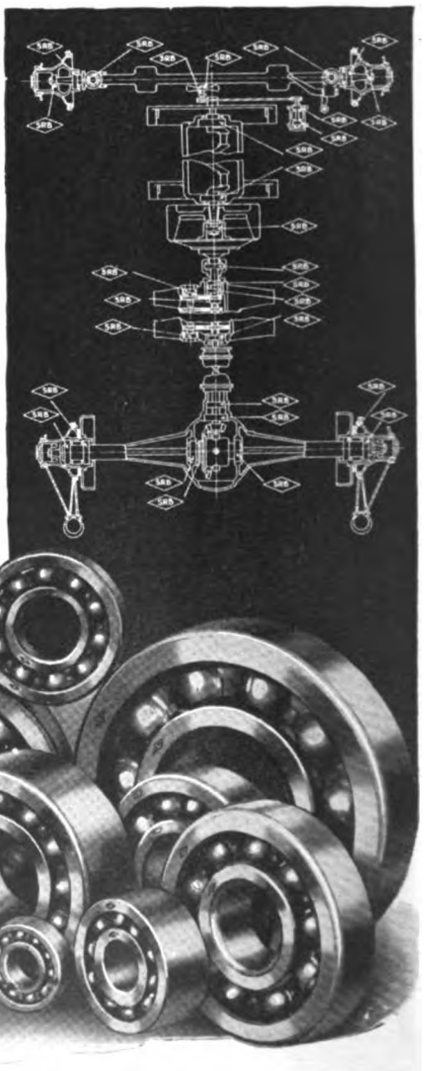
Philadelphia Standard Roller Bearing Co. Plainville, Conn. Norwich, Conn. New Haven, Conn. Pittsburgh Braeburn Steel Co.

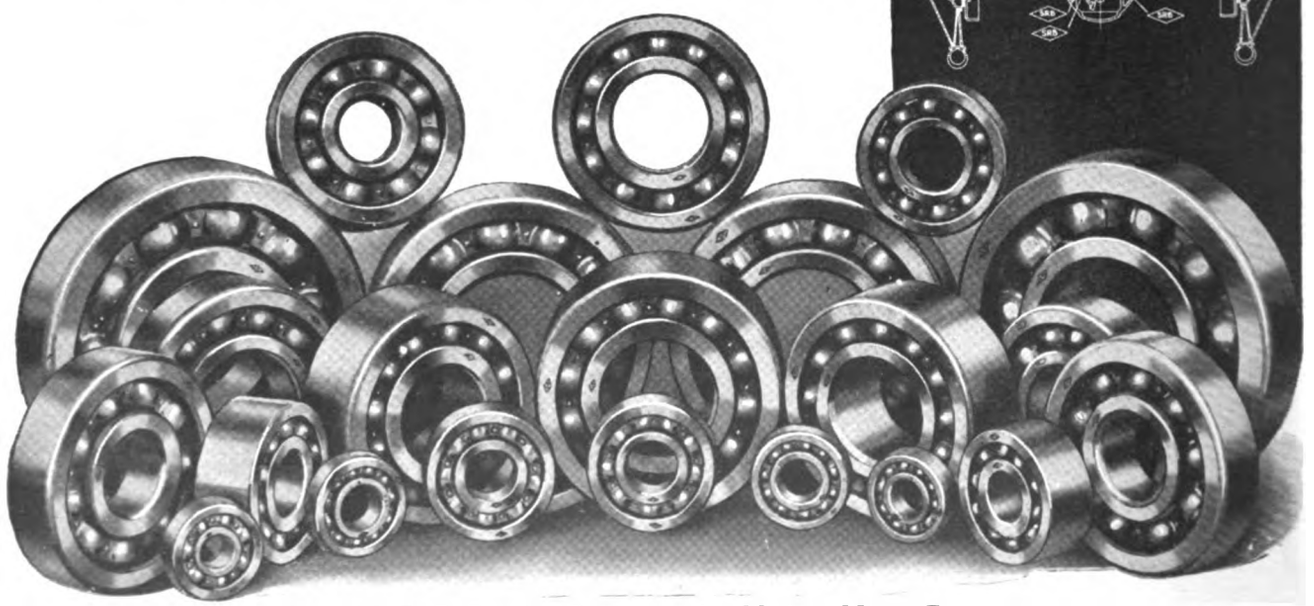
Standard Sales and Service Distributors in Principal Cities

Executive Offices: 347 MADISON AVENUE, NEW YORK CITY

Controlled and Operated by

MARLIN-ROCKWELL CORPORATION





Typical S. R. B. Bearing Equipment for Modern Motor Car

Please mention "Power Wagon" when writing to advertisers.

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EATON

THE DAY IS NOT FAR DISTANT WHEN THE NAME, EATON, WILL MEAN AS MUCH TO THE PROSPECTIVE MOTOR CAR OR MOTOR TRUCK BUYER AS IT NOW DOES TO THE ENGINEERING PERSONNEL OF THE AUTOMOTIVE INDUSTRY.

THE EATON AXLE COMPANY, CLEVELAND, OHIO

THE AXLE DIVISION OF THE STANDARD PARTS COMPANY

OTHER DIVISIONS ARE: THE PERFECTION SPRING COMPANY, THE BOCK BEARING COMPANY AND THE STANDARD WELDING COMPANY

AXLES

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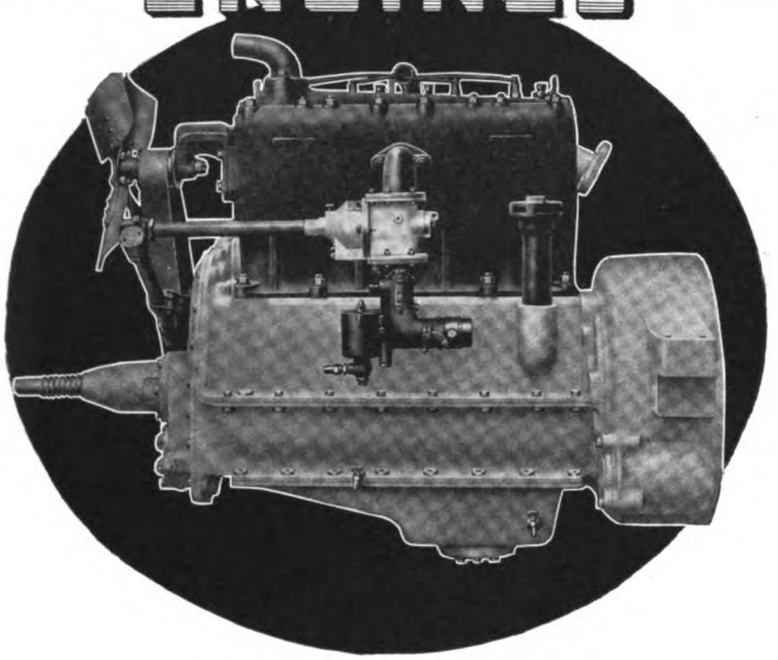
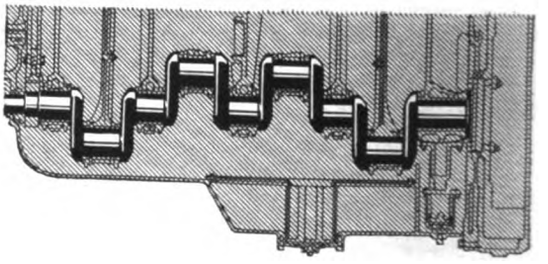
HERCULES
ENGINES





The Factor of Safety

Ample bearing surfaces; a sturdy crankshaft; positive lubrication; copious water spaces around the cylinder heads: in fact *every* detail of Hercules Engines has been designed to provide such a large factor of safety that it will be indifferent to the severest strains of heavy duty.

For the manufacturer who equips his product with Hercules Engines there is also the safety factor of dealing with a well-rounded, smooth-functioning organization of men experienced in engine building

A Crankshaft With 5 Main Bearings—

—eliminates deflection through the rigid support of a main bearing on each side of every crank pin.

—gives almost endless life of bearings.

—insures such perfect balance that periodic vibrations are eliminated.

—transmits all the generated power into actual driving effort.

The Hercules Motor Mfg. Company
Canton, Ohio

Sales Offices: Detroit Chicago Buffalo
San Francisco London, England

FOR TRUCKS AND TRACTORS

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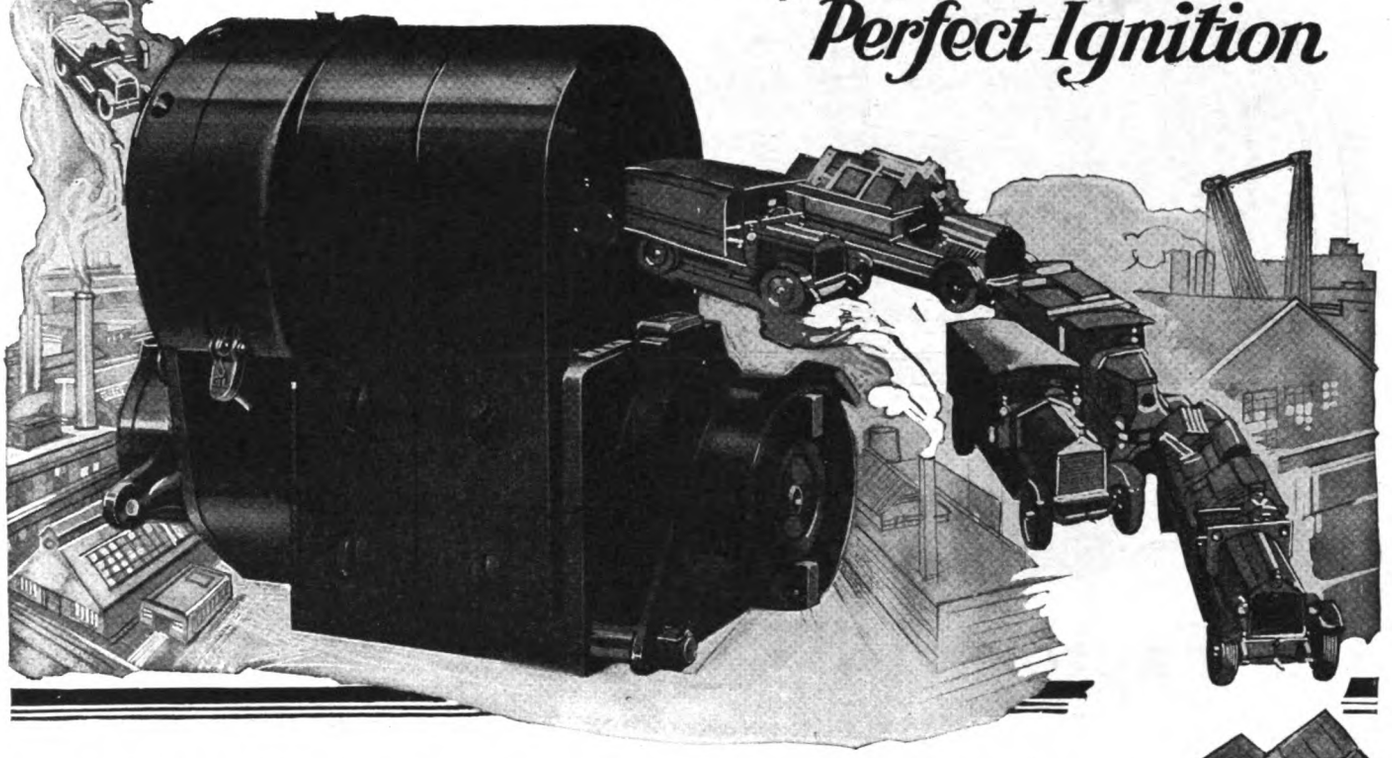
Thru the EISEMANN Magneto

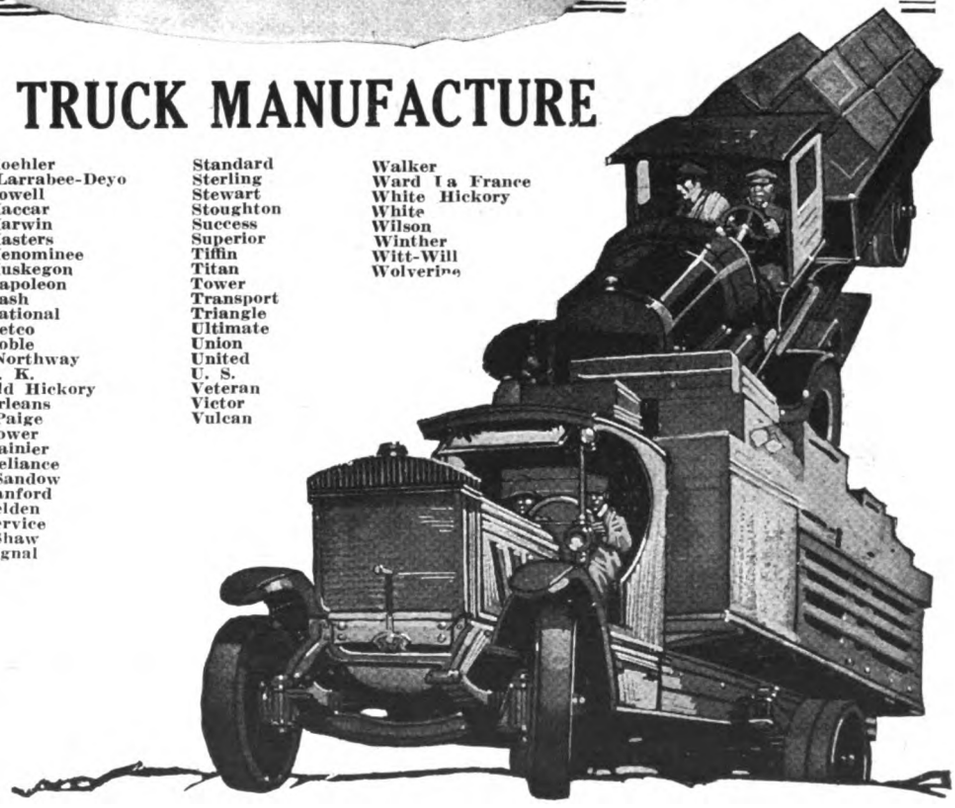
107 Truck Manufacturers Secure Perfect Ignition



"WHO'S WHO" IN TRUCK MANUFACTURE

Acason
*Ace
Acme
All-Power
American
American La France
Apex
Atco
Bell
Brockway
Burford
Capitol
Collier
Commerce
Concord
Corbit
Dart
D-E
Defiance
Denby
Detroit
Douglas
Dual
Eagle
Famous
Federal
F. W. D.
*Garford
Gary
Giant
G. M. C.
Graham Brothers
Gramm-Bernstein
*Hahn
Hal-fur
Hall
Harvey
Hawkeye
Highway
Higrade
Huffman
Hurlburt
Independent
Indiana
Italia
Jackson
Jumbo
Keldon
Kelly
*Kimball
Kissel
Kirby
Knox
Koehler
*Larrabee-Deyo
Lowell
Maccar
Marwin
Masters
Menominee
Muskegon
Napoleon
Nash
National
Neteo
Noble
*Northway
O. K.
Old Hickory
Orleans
*Paige
Power
Rainier
Reliance
*Sandow
Sanford
Selden
Service
*Shaw
Signal
Standard
Sterling
Stewart
Stoughton
Success
Superior
Tiffin
Titan
Tower
Transport
Triangle
Ultimate
Union
United
U. S.
Veteran
Victor
Vulcan
Walker
Ward La France
White Hickory
White
Wilson
Winther
Witt-Will
Wolverine

*Optional



THE EISEMANN MAGNETO CORPORATION
BROOKLYN, N. Y.

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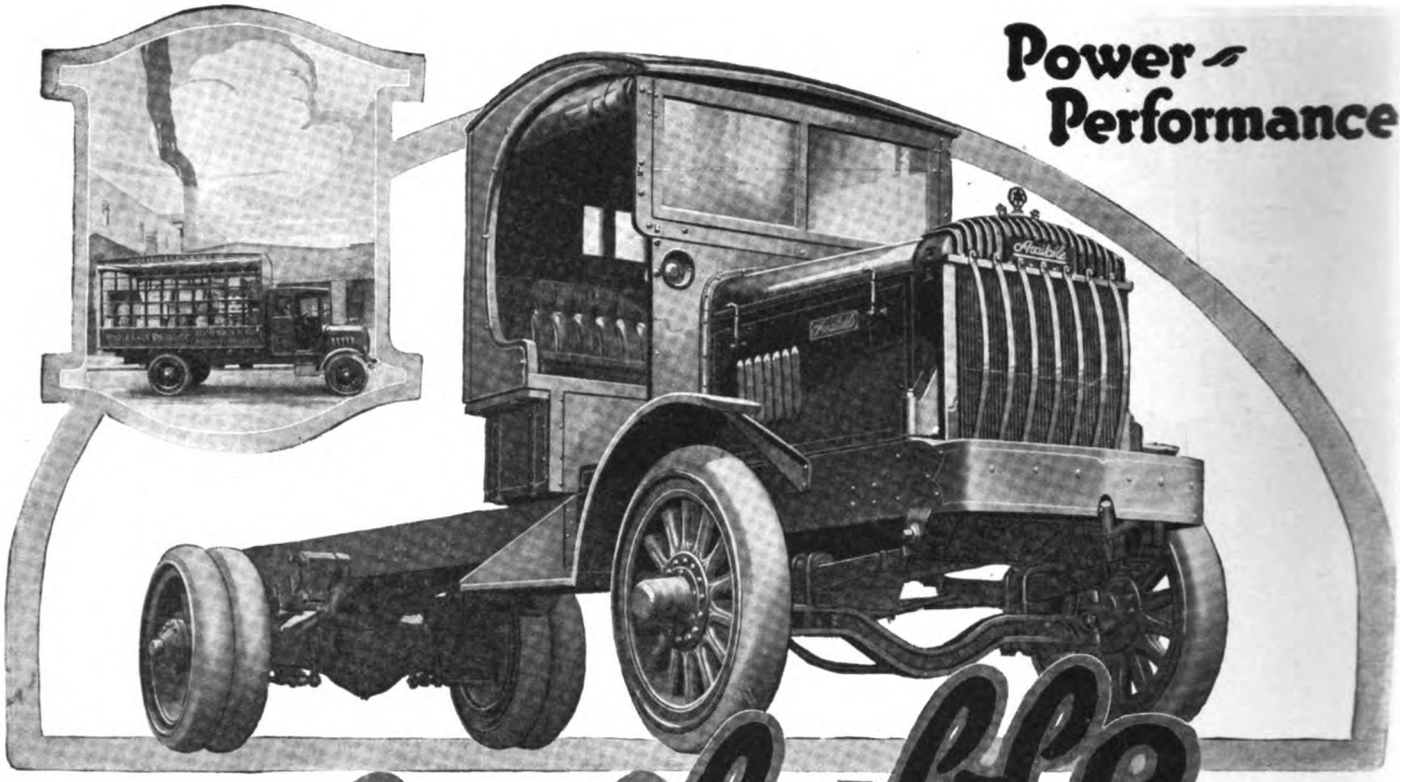
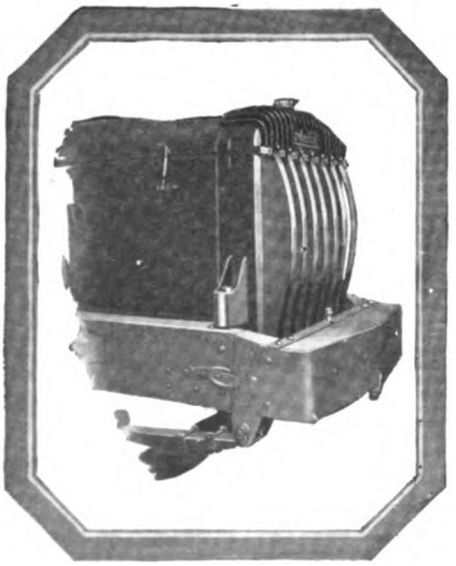


Available Trucks

Feature No. 7



Radiator Protection

Efficient protection of Available radiator shell and tubes is secured by heavy curved guards and a bumper.

Fitted into the front cross-member is a hickory block of sufficient thickness to protect the starting handle and faced with sheet steel to protect its surface. It is proof against breakage or deformation.

The radiator bars are large and have a pronounced outward curve. They are firmly fastened at top and bottom and closely spaced.

The shell itself is of great weight and strength, the various elements being so solidly bound together that they will resist nearly every shock.

The massive appearance secured by this thorough protection is backed up by honest performance of Availables under every hauling condition.

Our new 40-page Art Catalog describes all Available models and sets forth their advantages at length. Write Dept. U.

AVAILABLE TRUCK COMPANY

General Offices and Factory:

North and Kilpatrick Avenues, Chicago, Ill.

ABLE ALWAYS SINCE NIN

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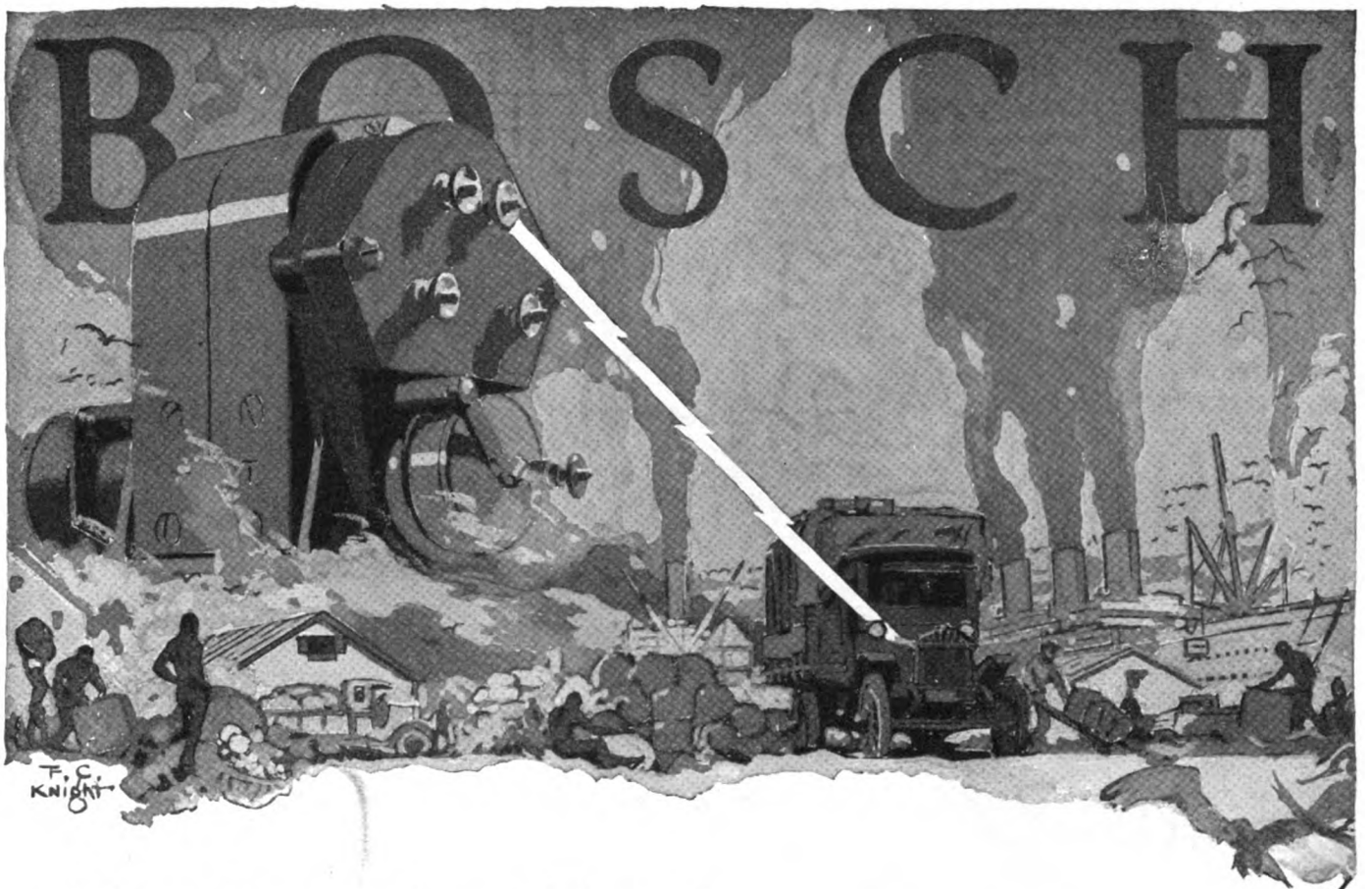

The Smoothest Road

Does your ignition system help to sell your truck—or are your trucks harder to sell on account of it?

Smooth out your selling road by insisting that your trucks are Bosch equipt and you'll find that your ignition is one of your strongest selling arguments rather than a doubtful quantity that has to be "put over."

Motor Trucks are bought for dependable, long, continuous, economical service—there is nothing manufactured that has a better reputation for those very qualities than Bosch Magneto Ignition.

Make Ignition a sales help—Insist upon Bosch and cash in.

Be Satisfied *Specify Bosch*

300 Service Stations in 300 Centers

AMERICAN BOSCH MAGNETO CORPORATION

Main Office and Works: Springfield, Mass.

Branches: New York, Chicago, Detroit, San Francisco

AMERICA'S SUPREME IGNITION SYSTEM

MOTOR TRUCKS – TRACTORS – AIRPLANES – MOTOR CARS – MOTOR BOATS – MOTORCYCLES – GAS ENGINES – ETC.

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Los Angeles says:

BETHLEHEM MOTOR★TRUCKS

"Delivery Boy" Chassis

1½ Ton Chassis
2½ Ton Chassis
3½ Ton Chassis

Some business man in your territory is going to add his name to ours and dominate the motor truck selling field.

Are you the man?

BETHLEHEM MOTORS COMPANY OF SOUTHERN CALIFORNIA
R. C. KLEPPER, FACTORY DISTRIBUTOR
BETHLEHEM MOTOR TRUCKS
LOS ANGELES, CALIFORNIA

April 12th, 1920.

Bethlehem Motors Corporation
Allentown, Pa.

Gentlemen:

The main reason for our becoming Bethlehem Distributors was not only the merit of Bethlehem Motor Trucks, but the spirit and attitude of the Bethlehem Organization.

Cooperation can either be a very empty word or one packed full of actual deeds. And we have found the Bethlehem definition of cooperation to be definite, tangible and a great stimulator of entries on the right side of the ledger.

Bethlehem Dependable Delivery backed by Bethlehem Advertising and Bethlehem Dealer Cooperation is unbeatable. Watch our sales curve through the coming year.

Very truly yours,

BETHLEHEM MOTORS COMPANY
OF SOUTHERN CALIFORNIA.
By R. C. Klepper

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The Business That Never Sleeps Demands Lamps That Will Stay Awake

SLUSH and mud, storm and blow—always on the go. Nothing must hinder the moving of milk—least of all, Motor Lamps whose lights bump off to sleep on rough, rutty roads.

In the Dietz "Monitor" Side and Tail Lamps, truck users are offered sure-burning night lights that are suitable for either heavy or lighter capacity trucks used in the milk industry or other transport work.

"Monitor" Lamps cost enough to be thoroughly good and dependable, but not a cent more.

Send for Catalog

R. E. DIETZ COMPANY

60 LAIGHT STREET, NEW YORK

FOUNDED 1840

JAMES BARNES, Sales Manager, Motor Truck Lamp Department
Carter Building, Rochester, N. Y.

DIETZ "MONITOR" MOTOR TRUCK LAMPS

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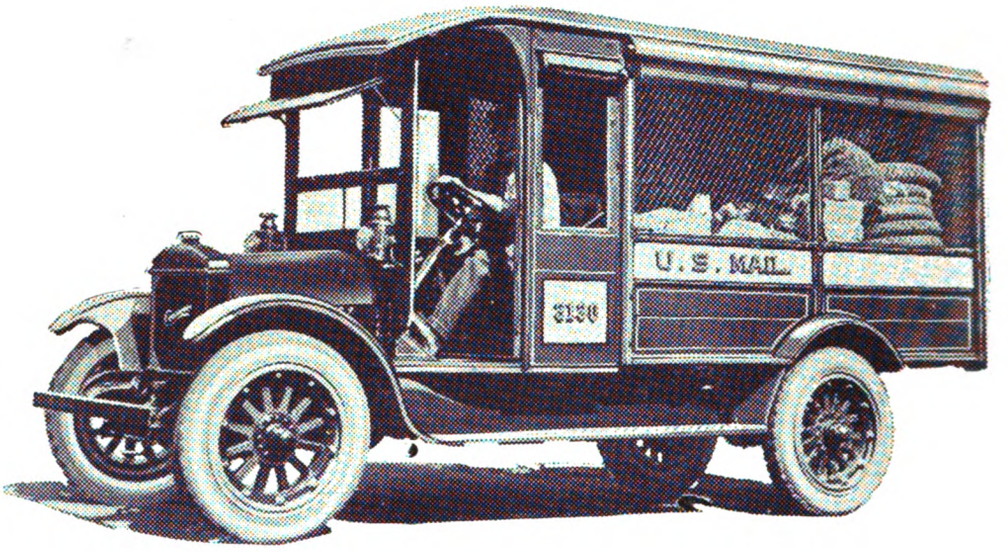
Commerce TRUCKS

On the Job for Uncle Sam



Commerce TRUCKS

Hauling the mail is hard, exacting work. Mail trucks must meet strict schedules day in and day out—must be swift, economical and absolutely dependable.

On the streets of scores of cities Commerce Trucks are daily fulfilling the exacting requirements of the Post Office Department in the hauling of mail. Out in the rural districts of Pennsylvania, Maryland, Virginia and Utah Commerce Trucks are hauling rural express for the Post Office Department—hard, exacting servcie.

Commerce Dealers must make money. Invariably the good truck dealer who appreciates what a good selling truck is today is the Commerce Dealer in that locality.

The Commerce Motor Car Company, Detroit, Mich.

Largest Manufacturers of 1 to 2 Ton Trucks *10th Year Truck Manufacturers*

Please mention "Power Wagon" when writing to advertisers.

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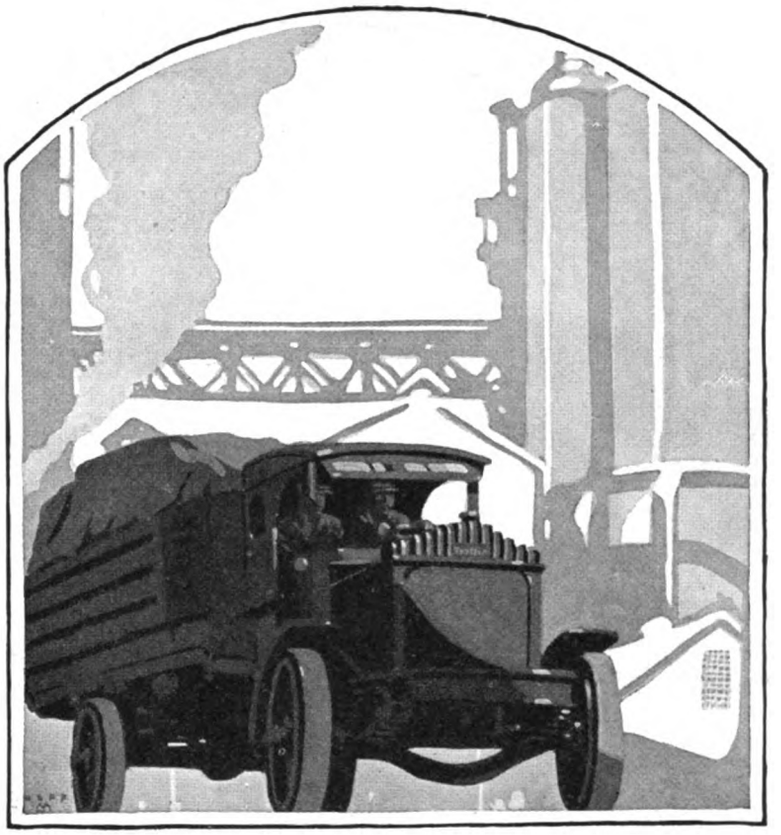
"Horse Sense"

Traffic Specifications:

Red Seal Continental 3¾ x 5 motor; ***Covert transmission;*** multiple disc clutch; *Bosch magneto; Carter carburetor;* 4-piece cast shell, cellular type radiator; drop forged front axle with *Timken roller bearings; Russel rear axle,* internal gear, roller bearings; semi-elliptic front and rear springs; *6-inch U-channel frame; Standard Fisk tires, 34 x 3½ front, 34 x 5 rear, 133-inch wheelbase; 122-inch length of frame behind driver's seat;* oil cup lubricating system; chassis painted stri-



Built of Standardized Units

The leading motor truck manufacturers are building trucks of standardized units.

A unit in the truck such as a Covert Transmission is a selling asset.

Covert is a standard of quality in the motor truck field.

This is why Traffic Truck advertisements and salesmen point with pardonable pride to the Covert Transmission which is standard equipment on Traffic Trucks.

COVERT GEAR COMPANY, INC.
Sales, Engineering and Factory: Lockport, N. Y.
Export Office: 100 Broad Street, New York City

"There is no Weak Point in a Covert"

COVERT TRANSMISSIONS

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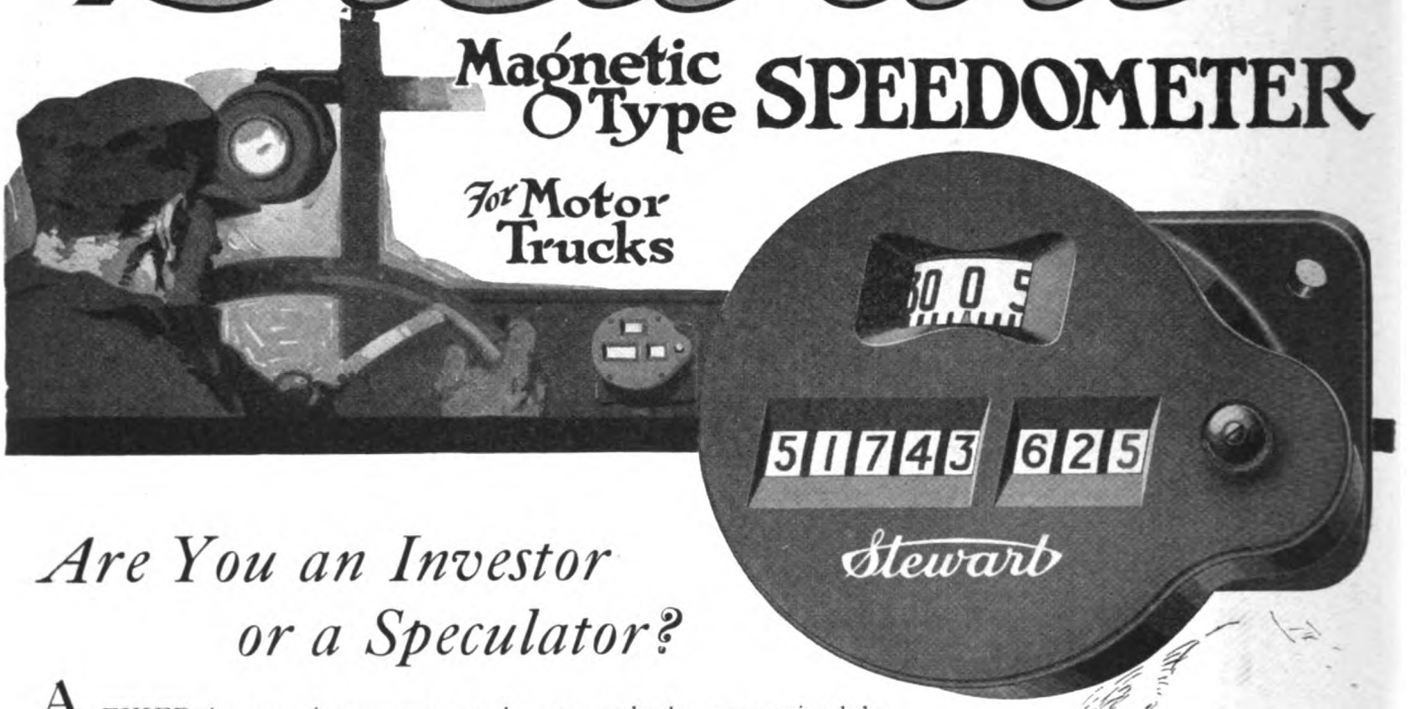
Stewart

Magnetic Type SPEEDOMETER

For Motor Trucks



Are You an Investor or a Speculator?

A FIXED income from your trucks can only be ascertained by determining the cost per mile. Do you want an unbroken series of cost records covering a long enough period of time to make them instant and trustworthy guides?

Would you bring to light the operating economics of one driver and the profit-eating carelessness of another?

Would you prove the qualities and brands of fuel, oil and tires?

Which is the cheapest and shortest route for delivery over a given territory?

Are you certain that your trucks are being operated at a minimum cost?

A Stewart Speedometer Will Tell You

To be operated most economically and profitably, every motor truck should be equipped with a Stewart Speedometer. It will answer all the above questions, and more. Will quickly pay for itself by reducing expenses.

Our special Truck Model was designed during the war for the U. S. Government. It will, therefore, stand up and render continuous service under the hardest usage.

Every truck should also have a Stewart Vacuum Gasoline System, a Stewart Warning Signal and be equipped with two Stewart Searchlights. Progressive truck and accessory dealers carry all these products as part of their regular stock.

Model 131 M

$35

Stewart-Warner Speedometer Corporation

CHICAGO, U. S. A.

Please mention "Power Wagon" when writing to advertisers.

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A MAXWELL 1½ TON TRUCK is often the long arm of an expanding enterprise. Business formerly out of reach is brought within grasp.

Maxwell

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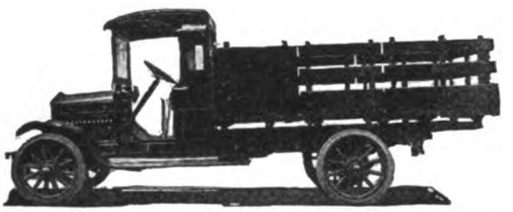
400x50=
?

CAN YOU FIGURE IT OUT?



Rainier

WORM DRIVE
Delivery Trucks

¾ TON—$1850
1 TON—$2050
1½ TON—$2150
2 TON—$2650

Four Hundred Times Fifty

THAT equals your profit on 50 trucks for the year at $400—(just for the sake of making a point).

But when 10 or 20 or 30 of these trucks come back a dozen times during the year for replacement—

What *does* happen to your profit of 400 x 50?

A truck must stay on the road to make money—for the man who sells the truck as well as for the man who buys it.

—To do that a truck must be made of the kind of units that mean service.

—To do that a truck must be constructed with the kind of engineering skill that makes a truck a piece of real machinery designed for efficient automotive transportation.

You men who know trucks—read the Rainier specifications. They tell their own story. And ask the happy dealer who sells Rainiers what kind of service is rendered by this "Little Brother to the $5,000 Truck."

That will give you the plain *facts* about the Rainier, unpolished by words of argument.

We will gladly send you details of our liberal contract terms—if you are a live-wire and can demonstrate your ability to sell a truck that shows a real profit.

Write—

Rainier Motor Corporation
SALES DEPARTMENT
227 West 58th Street, New York
Factory—Flushing, Long Island, New York

SPECIFICATIONS

MOTOR—Continental Red Seal in all models

CLUTCH—Brown-Lipe multiple disc

SPRING CONSTRUCTION—Patented double safety shackle on front end of rear springs

TRANSMISSION — Brown-Lipe

REAR AXLE—Timken and Sheldon worm and gear

CARBURETOR—Zenith, with Stewart Vacuum system and Monarch Governor

IGNITION—

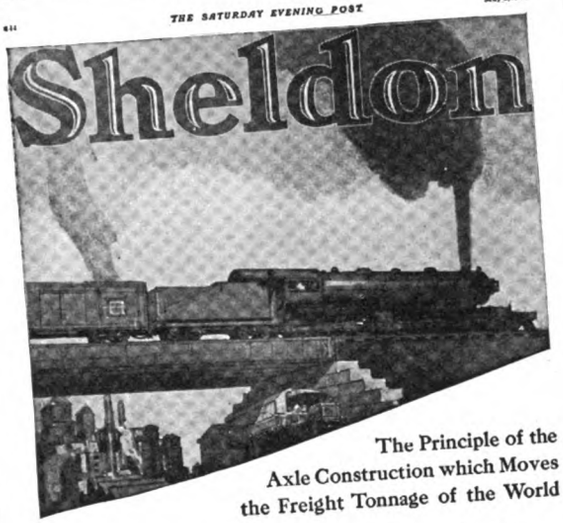
WHEELBASE—¾ Ton 125"; 1½ Ton 133"; 2 Ton 147"

LOADING SPACE—¾ Ton 90"; 1½ Ton 9' to 10'; 2 Ton 11' to 12'

Digitized by Google

THE more the truck user knows about the principles of axle construction, the more he inclines toward Sheldon. This is one of the tangible results of a campaign of advertising that gets down to the root of things and *gives reasons.*

Sheldon



The Principle of the Axle Construction which Moves the Freight Tonnage of the World

THE wheels of a locomotive are fixed rigidly to the live, load-carrying, revolving axle. This principle is adopted because it permits the bearings to be placed far apart and the axle to act as a lever to brace against side-strains, especially when rounding curves.

With this axle equipment, locomotives and freight cars carry the Freight Tonnage of the World.

Sheldon Worm Gear Axles for motor trucks are constructed on the same principle as is employed in locomotive and freight-car axles.

Axle

FOR MOTOR TRUCKS

WHERE the railroad leaves off, the motor truck takes up the burden of freight delivery.

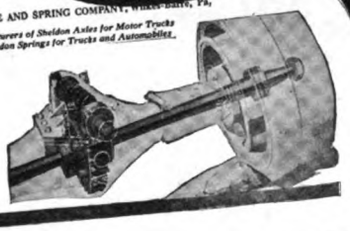
In motor truck construction the axle is the most important factor, for service demands and economy of upkeep make supreme axle strength necessary.

When you buy a truck, remember there is one of every size from ½ to 5-ton capacity, and for every purpose, equipped with Sheldon Worm Drive Axles, the axle [illegible] locomotive axle [illegible]

Send for the booklet on Sheldon Superiorities—it's yours on request.

SHELDON AXLE AND SPRING COMPANY, [illegible], Pa.

Manufacturers of Sheldon Axles for Motor Trucks and Sheldon Springs for Trucks and Automobiles



Look for this Sheldon trade-mark cast on the housing at the rear end of the worm gear. It identifies a Sheldon axle and is your assurance of strength, long life, safety, and economy of upkeep.

TRADE MARK

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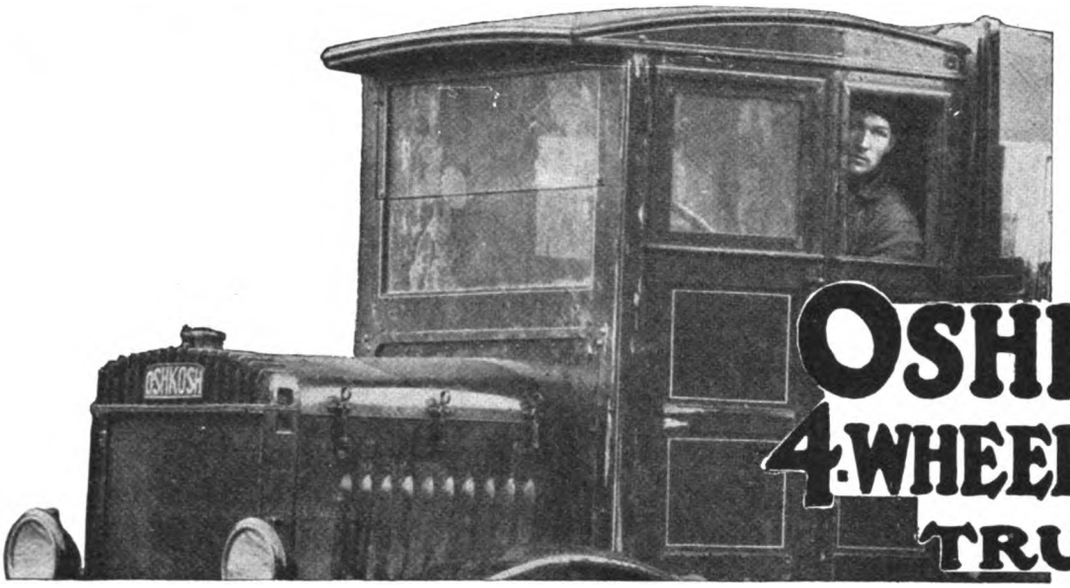
The comfortable all-weather cab is



standard equipment on the

OSHKOSH 4-WHEEL-DRIVE TRUCK

WE consider the all-weather cab an essential part of a truck's equipment. Otherwise, the owner must buy one or make the driver go without this protection—*an expense either way.*

The all-weather cab of the Oshkosh 4-Wheel-Drive means better satisfied drivers, furnished with shelter from the elements—warmth in winter, shade in summer.

Consideration for your driver's comfort will make him show greater consideration for your truck. He is not so likely to put on excessive speed, nor keep the truck standing idle, to escape storms, showers or biting winds.

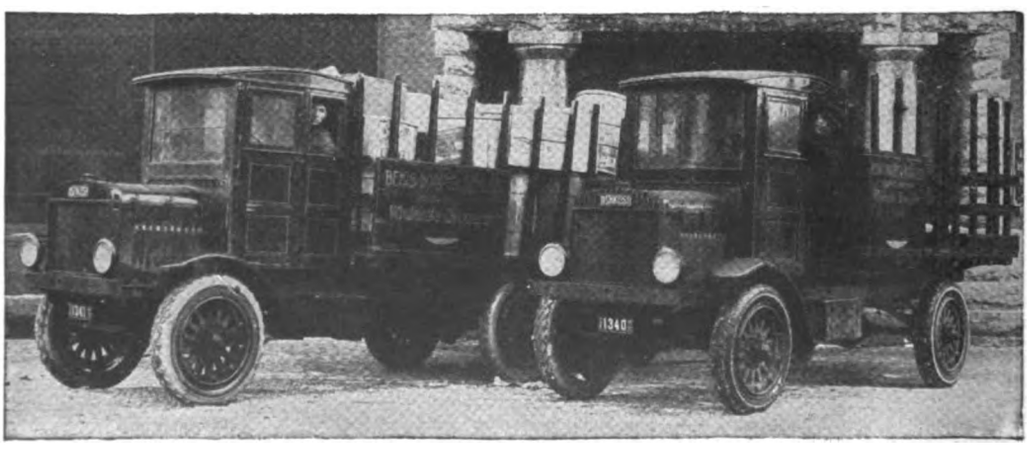
The all-weather cab included with the Oshkosh 4-Wheel-Drive Truck is merely one feature of this *completely equipped* truck—just an instance of the greater value it offers.

Hundreds of Dollars Saved in Standard Equipment that Most Manufacturers Class as Extras

The Oshkosh 4-Wheel-Drive was the first 2-ton truck regularly equipped with pneumatic truck-type cord tires without extra charge. It also includes as standard equipment, demountable rims, electric lighting and starting, electric horn, speedometer, and 4-inch steel bumper. Nothing to be added except body to fit your particular needs.

The test of service has shown over and over that Oshkosh 4-Wheel-Drive Trucks furnish the utmost in power to "pull through" and deliver the load under all conditions. Let us send you the proof.

OSHKOSH MOTOR TRUCK MFG. CO., Oshkosh, Wis.



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HIGHWAY TRAILER

EDGERTON WISCONSIN

Undersells Average Trailers $250 to $400

The Only Trailer Accepted Without Design Change By the U. S. Government

You cannot fail to be impressed by the great number of truck operators who are adding Highway Trailers.

Most of them formerly used trucks only.

Now their policy is exactly reversed. Instead of more costly trucks to increase haulage capacity, they are adding Highway Trailers up to the limit of their draw-bar pull.

Consider the price advantage. Business men do not ignore such savings. In many cases they exceed the net yearly earnings of a truck in constant service.

Highway Trailers cost from $1875 to $3955 less per unit than trucks of equal capacity.

And giving equivalent service, they save from $3000 to $6000 a year over the operating cost of a truck.

The U. S. Government operates more than $1,000,000 worth of Highway Trailers.

Dealers find quick sales for the trailer with all these dominant advantages. Don't overlook this opportunity to build a big, permanent business, with real profits. Write for details today.

Note Price Advantage of Highway Trailers

1½ Ton $725	2½ Ton $935	4 Ton $1225	6 Ton $1545

These Are a Few Truck Operators Using Fleets of Highway Trailers

U. S. Army, U. S. Navy
"Piggy Wiggly" Chain Stores
Headquarters, Chicago, Ill.
The National Tea Company
The Consumers Refining Co.
Chicago, Iil.
The Cadillac Motor Car Co.
Detroit, Mich.
The Timken-Detroit Axle Co.
Detroit, Mich.

The Sterling Motor Truck Co.
Milwaukee, Wis.
The Manitowoc Ship Yards
Manitowoc, Wis.
Fairbanks-Morse Company
Beloit, Wis.
Southwestern Telephone & Telegraph Company
St. Louis, Mo.

Melchior, Armstrong & Dessau
Buenos Aires, Argentine
Montevido, Uruguay
Barbados Islands
Towars Creamery Company
Detroit, Mich.
City of Washington, D. C.
One-Wheel Truck Company
St. Louis, Mo.

(35)

The Piggly Wiggly Chain Stores "All Over the World" Use Highway Trailers

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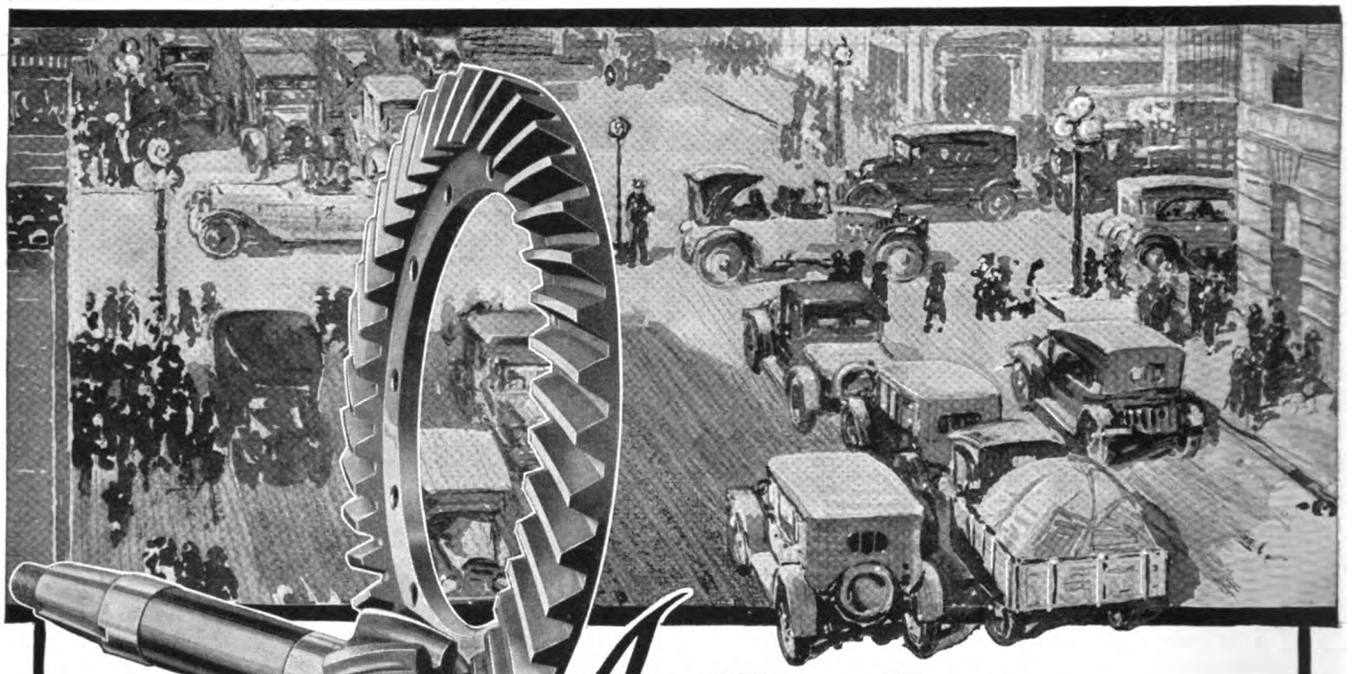

All Gear Problems Correctly Solved

BROWN-LIPE CHAPIN DIFFERENTIALS

THREE variables of wide range — Load, Speed and Installation — must be provided for in designing the best form of gears for a particular use. Other considerations that affect the design are Service, Weight and Price, and all must be scientifically met, if the gear is to give satisfaction.

To design the many necessary forms of differentials and transmissions, each conforming to a different set of rigid specifications, calls for judgment possessed only by expert engineers of long experience. To manufacture in large quantities and yet hold strictly to each detail of design requires a vast organization of highly trained men, furnished with every facility for their work.

Back of Brown-Lipe gears are the engineering departments, workmen and equipment that meet every requirement for making their high class products.

BROWN-LIPE GEAR TRANSMISSIONS

BROWN-LIPE-CHAPIN CO.
DIFFERENTIALS

BROWN-LIPE GEAR CO.
TRANSMISSIONS

Both at SYRACUSE, N. Y.

No. 12 of 40 Reasons for Superiority

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Kissel Dependability

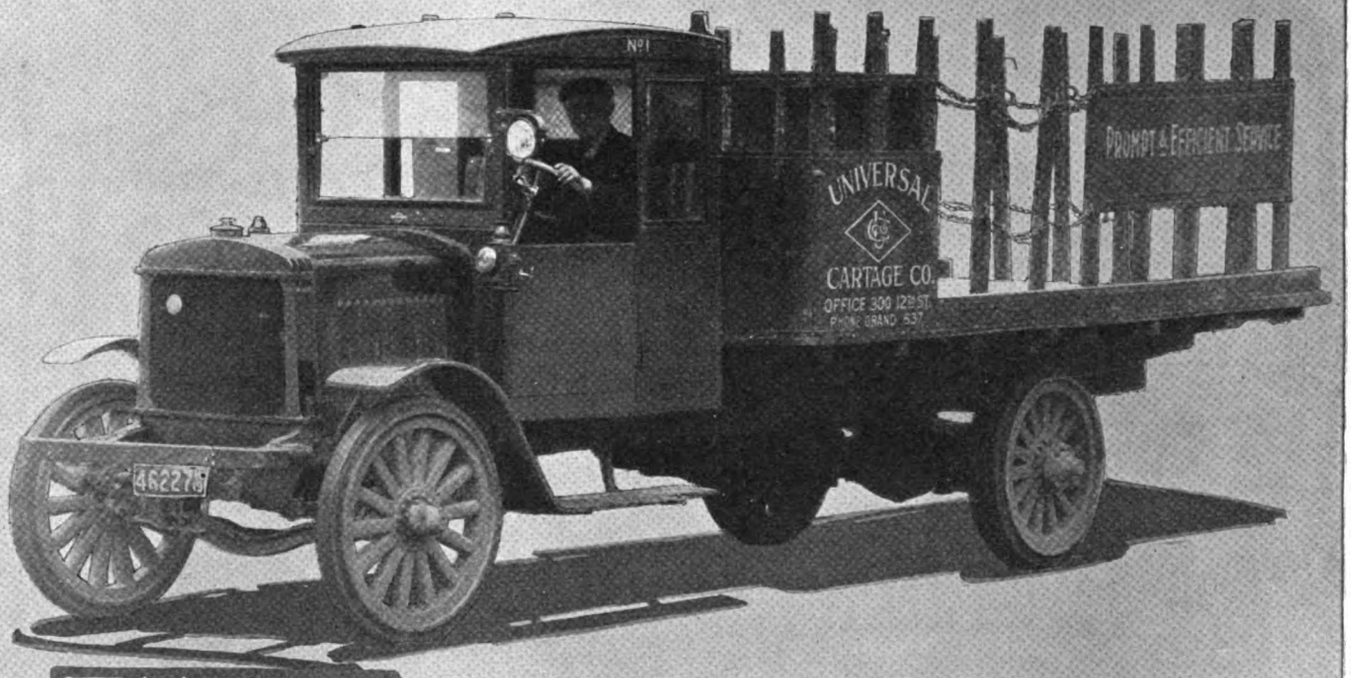
"The result of 14 years transportation engineering—plus designing and construction experience of trucks in use; a definite Kissel policy of efficient factories, organization and capital to build trucks that actually meet and stand up under respective transportation needs"—

Standardizes Transportation Equipment

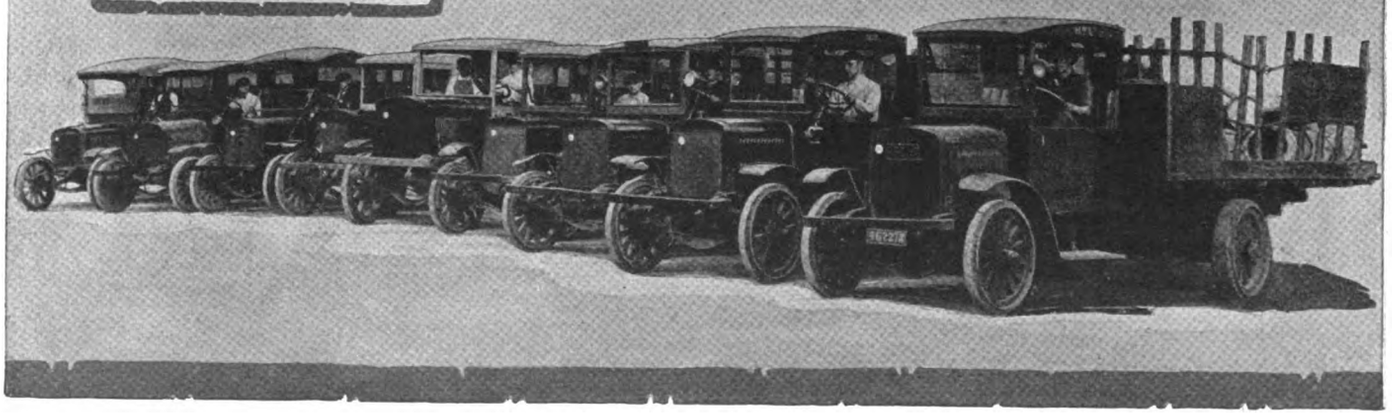
Because owners experience such unusual satisfaction that they standardize on Kissel Trucks as their increased requirements demand — is the reason why the Kissel single unit owners of today become the Kissel fleet owners of tomorrow.

Five sizes—specifications, catalogs from nearest Kissel distributor or

KISSEL MOTOR CAR CO., Hartford, Wis., U. S. A.



The Universal Cartage Co. of Milwaukee, started with one Kissel Truck (above). "Our standardizing on nine Kissel Trucks (below) has revolutionized our transportation efficiency," says President Vander Heyden.



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United States Motor Trucks

FLOATING POWER PLANT

Uncle Sam uses 23 U. S. Motor Trucks in Cincinnati

The Dealer Sells a U. S. Truck
The Truck Sells a Whole Fleet

THE Postoffice authorities in Cincinnati, 18 months ago were up against a very serious problem—six different railroad stations and over 60 suburban postoffices to travel between. The hills and rough streets of Cincinnati are famous. Time had to be made, with the worst possible hauling conditions to meet U. S. Trucks were adopted as standard because "they delivered the goods"

No truck has ever handled Cincinnati's mail so promptly and efficiently, with so few lay-ups for repairs.

This is one example of 100% satisfactory service given by U. S. Trucks to fleet owners. In every instance where U. S. Trucks are given a trial they make good and become the foundation for a fleet.

What does this mean to you? the dealer? It means, you sell a firm once—for all time—on the United States Truck.

One exclusive feature—the Floating Power Plant, giving the truck an even, steady pull under most adverse going conditions—contributes largely to the success of this truck.

The complete U. S. line—5 worm-drive models, two with Clark axles—1½ to 6 tons. Two years ahead in engineering design and construction, quality of materials and refinement of details, meets every haulage requirement.

Are you a new dealer?

Or an established dealer contemplating new connections?

In either case you will be interested in our Dealer's proposition on this fast selling truck.

For particulars—address Mr. W. R. Kyle, care of The United States Motor Truck Co., Cincinnati, O.

The United States Motor Truck Co. *Incorporated*
CINCINNATI, OHIO.

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Why Motor Trucks Reach A Premature Old Age

Sent Free

A Book That Tells How To Keep Your Motor Trucks On The Job ~ Instead Of In The Repair Shop

Motor trucks are profitable only when they show a definite saving in cost of transportation. Don't let upkeep costs play havoc with your profits.

This book explains in a graphic manner how most of the trips to the repair shop can be avoided and truck upkeep cost reduced to a minimum.

Pierce Governors

Are Standard Equipment on 103 Makes of Trucks

These far-sighted manufacturers know why trucks reach a premature old age, and they know how to prevent it—that's why they are spending thousands of dollars yearly to equip their trucks with Pierce Governors.

But the average truck owner and truck dealer has only a vague idea of the governor's relation to truck upkeep cost.

Get this book by all means. It contains data that is valuable to everyone interested in efficient motor truck operation.

The Pierce Governor Company

"WORLD'S LARGEST GOVERNOR BUILDERS"

Anderson ~ Indiana
U·S·A·

MAIL THIS COUPON TODAY

Pierce Governor Company, POWER WAGON—June
Anderson, Ind., U. S. A.

Gentlemen:

Send me free of charge a copy of your new book that tells how to operate motor trucks more efficiently, and at the same time reduce maintenance costs.

WE..... MOTOR TRUCKS.....
(operate or sell) (make of trucks)

Name.....

Street Address.....

Town..... State.....

Write address plainly

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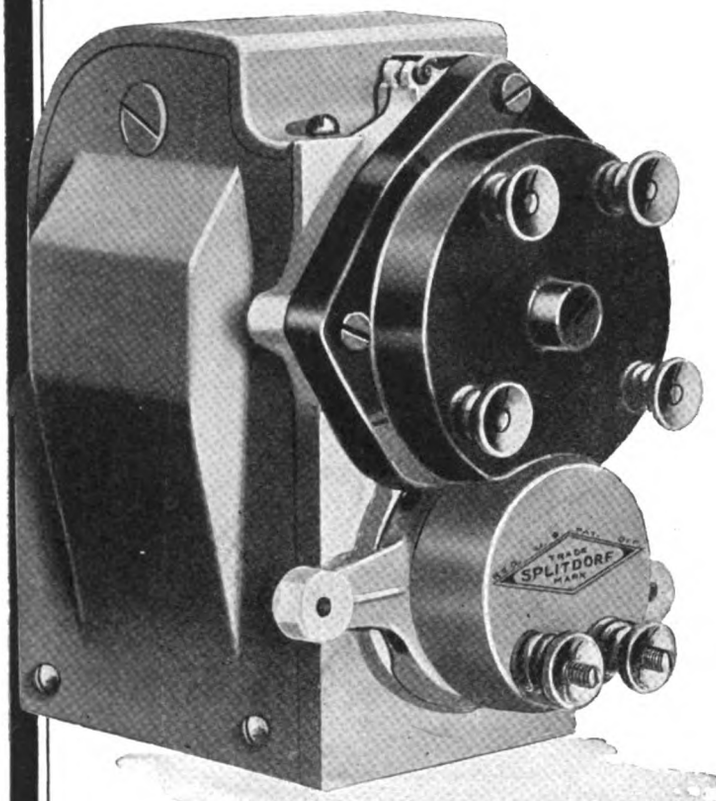
GOOD COMPANY



Run your eye down the list of trucks which have established for themselves wonderful records of efficiency. Note their specifications. Check up on the good company they keep.

Invariably you will find under the heading "Ignition" the word SPLITDORF.

The "Grant Truck" is one of them.

Trucks of the character using the Splitdorf Magneto revolutionized transportation because they always delivered that which the business man expected to buy—dependable service—and Splitdorf ignition helped to carry them along to success.

SPLITDORF ELECTRICAL CO.
NEWARK, N. J.

TRADE
SPLITDORF
MARK

Established
1 8 5 8

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In Porto Rico —

"We would like you to know that the Mack Trucks are running to our entire satisfaction. We will say, moreover, that the radiating system is wonderful. Although operating here in the tropics, the water never becomes excessively hot."

THE Solderless *Mack* radiator, circular in design, built around a blower type fan and located *behind* the motor insures Bull Dog *Mack* radiator efficiency in the tropics—and in daily service over long, "low-gear" grades.

Mack Engineering features, combined with 18 basic *Mack* patents, have developed the Motor Truck the world is talking about.

Capacities, 1½ to 7½ tons. Tractors to 15 tons.

Full Information Upon Request.

INTERNATIONAL MOTOR COMPANY, NEW YORK

Mack TRUCKS

"PERFORMANCE COUNTS"

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Victor

1½ and 2½ tons

The Victor worm drive motor truck is designed to stand rough usage and to give long and continuous service. That it is doing this is evidenced by repeat orders and its large number of satisfied users.

Victor dealers have the satisfaction of knowing that the Victor will make good on every claim that is made for it.

Your territory may still be open.

Write for particulars.

Victor Truck Company

St. Joseph Michigan

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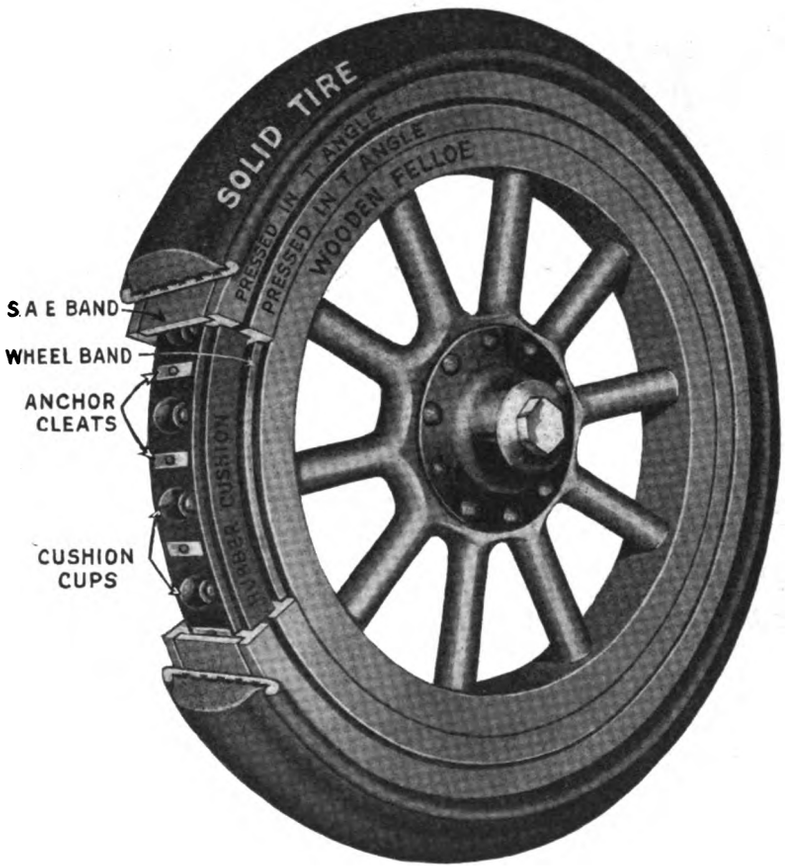
MARTIN
CUSHION WHEELS
for Motor Trucks

No bolts
No nuts
Pressed on
Throughout
Light
Strong
Resilient
Durable



Backed
by
Nine Years'
Experience
in Building
Good
Cushion
Wheels

Adopted for Standard Equipment on
"OLD RELIABLE" MOTOR TRUCKS
1½ to 7 Ton

MARTIN CUSHION WHEEL CO.
311-13 N. Sangamon St. **CHICAGO, ILLINOIS**

Branches and Service Stations in All Principal Cities

QUOTATIONS SENT UPON REQUEST

Please mention "Power Wagon" when writing to advertisers.

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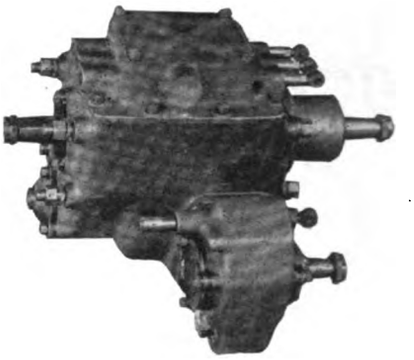
FULLER TRANSMISSIONS



IT IS WELL to have units in your trucks which will add to its prestige.

FULLER TRANSMISSIONS are favorably known throughout the United States.

MANUFACTURERS of transmissions, clutches and controls exclusively.

FULLER & SONS MFG. CO.

KALAMAZOO, MICHIGAN

Detroit Office — **Kresge Building**
New York Office — **American Circle Building**
San Francisco Office — **Rialto Building**

WATSON

MOTOR TRUCKS

¾-1 Ton — 2½ Ton
1½ Ton — 3½ Ton

Road Tractor *Trailers*

WATSON HAULAGE SYSTEMS MOTOR TRUCKS

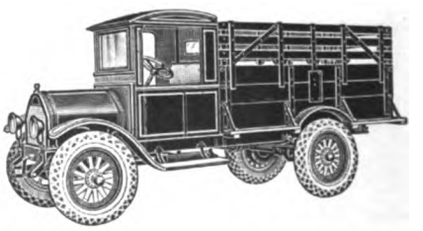
Watson Products Corporation
Main Office and Factory
Canastota, N. Y.

The Luverne Farm Truck

Capacity Two Tons

PRICE $1800.00

Including Electric Starter and Lights, Semi-Enclosed Cab and Combination Grain and Stock Body



These trucks have been on the market for over three years, during which they have fully proven their ability to meet the requirements of the **Farm Trade** in a superior manner.

Ask for our Dealers' Proposition

LUVERNE MOTOR TRUCK COMPANY
LUVERNE MINNESOTA

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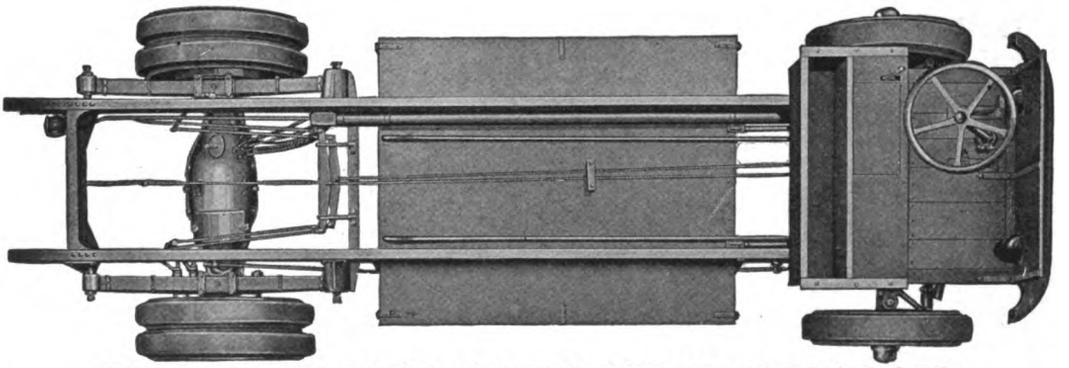
HIGHLAND STANDARD BODIES AND CABS

THE HIGHLAND BODY MFG., CO.

CINCINNATI **OHIO**

WALKER ELECTRIC TRUCKS



THE WALKER IMPROVED CHASSIS

THE UTMOST IN *SIMPLICITY*—ONE THOUSAND FEWER PARTS THAN ANY GASOLINE CHASSIS
WALKER ELECTRIC CHASSIS ARE OPERATING *PROFITABLY* IN ALL INDUSTRIES.

ASK ANY WALKER USER, BRANCH OR DEALER

WALKER VEHICLE COMPANY

America's Leading Manufacturer of Electric Trucks and Tractors

NEW YORK CHICAGO BOSTON

LOWEST-TRUCKING-COST

Please mention "Power Wagon" when writing to advertisers.

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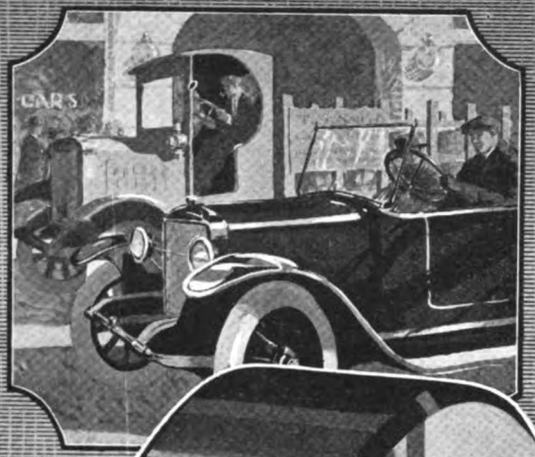
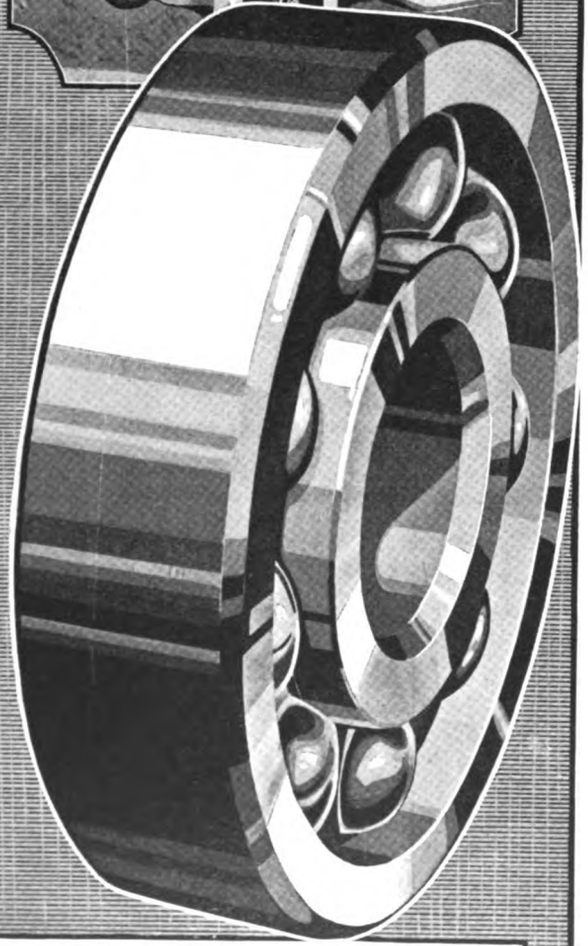
NEW DEPARTURE
Ball Bearings





New Departures in your line of cars or trucks are a real big advantage to you. Lots of things you had not realized are told in our "Brown Book"—that help you sell and keep your line sold. A post card will bring your copy promptly.

The New Departure Mfg. Co., Bristol, Conn.

Detroit 547 Chicago

PNEUMATIC TRUCK TIRES

Write if Interested!

Splendid selection of factory-blemished and surplus stocks from the better Akron factories

The Rubber City Clearing House Co.
AKRON, O OHIO.

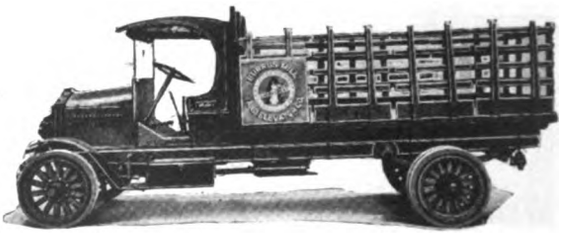
THE Sanford MOTOR TRUCK

Worm Drive

2½, 3½, 5 Tons

Experience Counts

Sanford Trucks



Model W-35, Capacity three and one-half tons. Bought by the Barrus Mill & Elevator Co., Fort Worth, Tex.

Dependability in the Sanford is the result of long experience knowing truck users' needs, the use of quality materials and workmanship, and the application of right manufacturing methods.

Experience counts with us as it does with users.

Sanford Motor Truck Co., Syracuse, N. Y.

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1½ Ton 2½ Ton 3½ Ton 5 Ton

Worm Drive Models

Write for complete information

SELDEN TRUCK CORPORATION
ROCHESTER, N. Y., U. S. A.

Selden Motor Trucks

WOOD DETROIT

HYDRAULIC HOISTS AND Steel Dumping Bodies

manufactured by

Wood Hydraulic Hoist & Body Company

Main Factory
1026 Bellevue Avenue
Detroit, Michigan

Branches

New York	Chicago	San Francisco
721 E. 135th St.	2911 Indiana Ave.	441 Folsom St.

LEE TRAILERS

Make Motor Trucks Pay

If one of your customers asks your opinion about trailers, are you prepared to give him a good trailer talk?

No matter whether he will ever be a truck prospect again, you owe it to yourself to sell him a trailer if you can.

Why not be something more than a truck dealer? Be a transportation engineer and sell trailers incidentally.

Many truck dealers early realized the advantage of selling trailers. Their truck sales have increased.

A wise dealer sells trucks and trailers, preferably *LEE* trailers.

By doing so he makes two blades of grass grow where one grew before.

Send for Lee Line data sheets.

LEE LOADER & BODY CO.

Builders of Automotive Auxiliary Equipment

2337 So. La Salle St. Chicago

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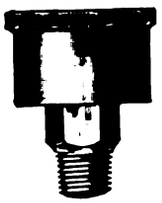
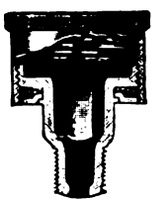
Empress
Grease and Oil Cups

Standard Lubricator Equipment

There are, by far, more Empress Lubricators in use on passenger cars, motor trucks, and tractors than all other types of grease cups, oil cups and lubricating devices combined. Their dependability and serviceability are best proven by this fact alone.

Since the birth of the motor vehicle industry, they have done their part, providing effective lubricators for every conceivable part requiring lubrication.





EMPRESS
No. 207 Leather Packed Grease Cup

This cup for years has been very much in demand by designers and builders of automobiles, motor trucks, etc. Its simple design, dependability, and ease of operation has made it a most popular cup.

The leather packing not only effectively prevents leakage of grease but also acts as a stop preventing loss of cap through vibration. The plain exterior leaves nothing to catch dust and dirt.

Cannot get out of order and will stand hard usage.

Made in seven sizes and in four different finishes.

CATALOG R shows many other types equally good—WRITE FOR IT.

BOWEN PRODUCTS CORP.

Manufacturing and Sale Divisions:
AUBURN DIV., AUBURN, N. Y. MINNEAPOLIS DIV., MINNEAPOLIS, MINN.
WINKLEY DIV., DETROIT, MICH. ZERK DIV., CLEVELAND, OHIO
Canadian Factory—CANADIAN WINKLEY CO., Ltd., WINDSOR, ONT.

Branch Sales Offices:
NEW YORK, 220 BROADWAY CHICAGO, 1607 OTIS BLDG.
BOSTON, 253-255 FRANKLIN ST. CINCINNATI, 409 LYRIC BLDG.
SAN FRANCISCO, MONADNOCK BLDG.

Wolverine

The Truck of Good Service

The Wolverine was "dubbed" such by a user who bought one, then a second and now a third. He bought on **Performance.**

That the Wolverine contains units that the trade recognize as of the best is but natural. No more careful workmanship is used on any truck, nor is the average factory test and inspection as critical.

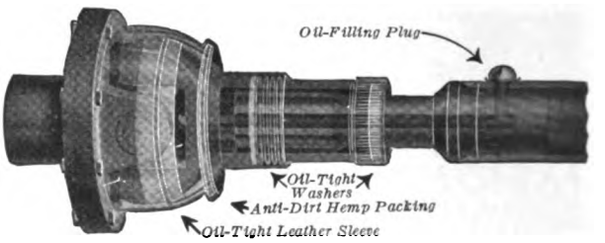
All this has produced a truck that you can sell on its strength to do the job continuously—to perform economically.

If you are looking for a truck of such nature to sell at a moderate price, wire us for territory and terms.

Of course, the "Wolverine" is equipped with a self starter and electric lights.

American Commercial Car Co.
DETROIT, MICHIGAN

"M & E" Universal Joint
(Pat. and Pat. Pend.)



THIS joint embodies the best points devised by Automotive Engineers for the War—U. S. and Allied program.

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This joint is simple, very strong and has ample bearing surfaces.

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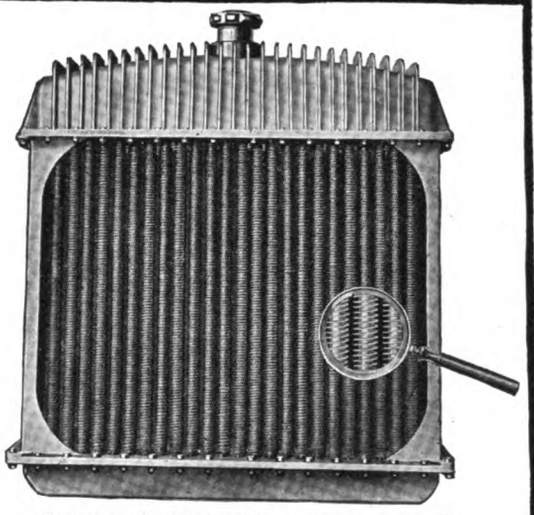

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Proper protection against evaporation will save from 5% to 20% of gasoline in storage. A necessary economy today.

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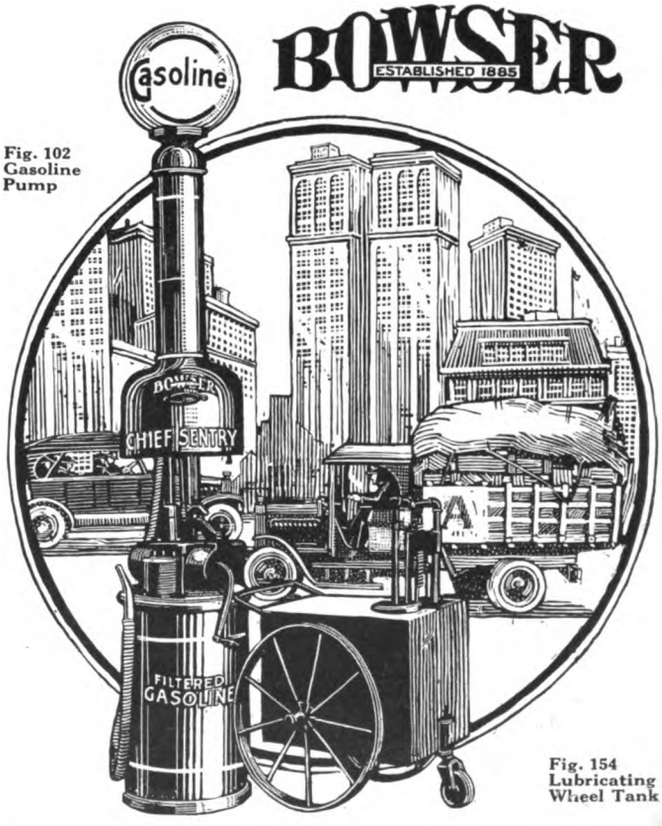

Fig. 102 Gasoline Pump

Fig. 154 Lubricating Wheel Tank

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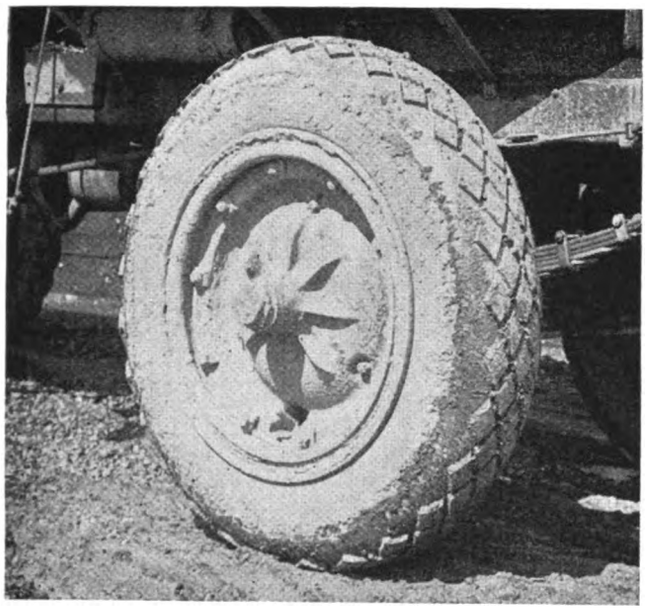

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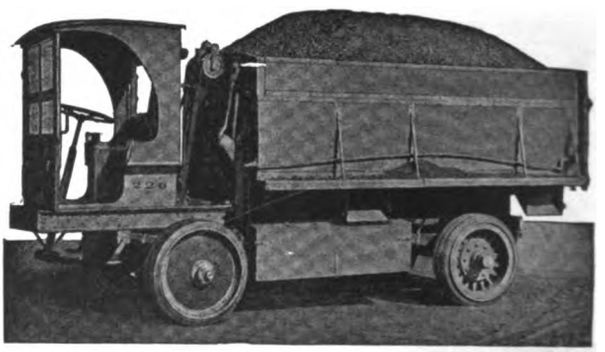

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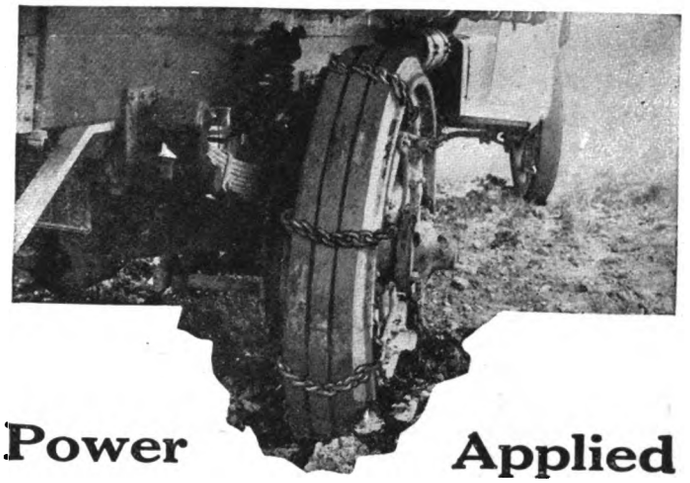

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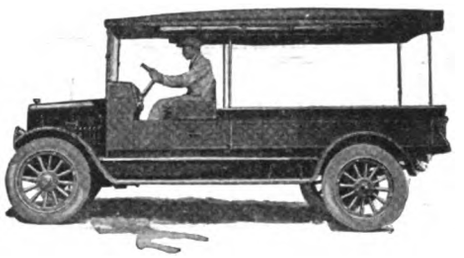

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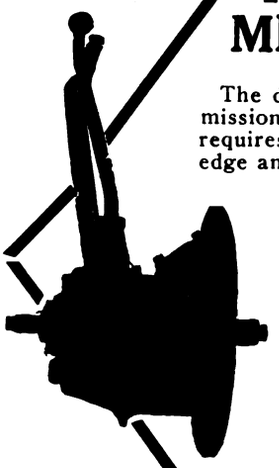

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They save money for you.

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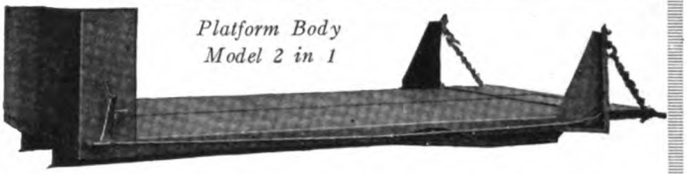

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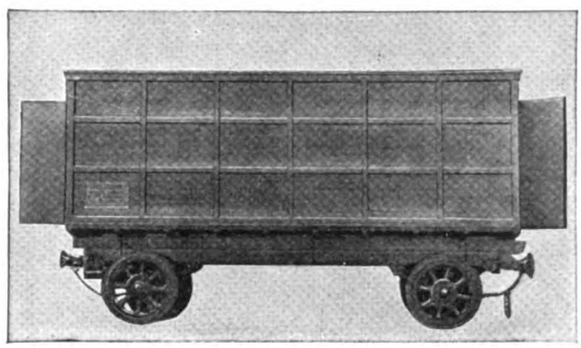

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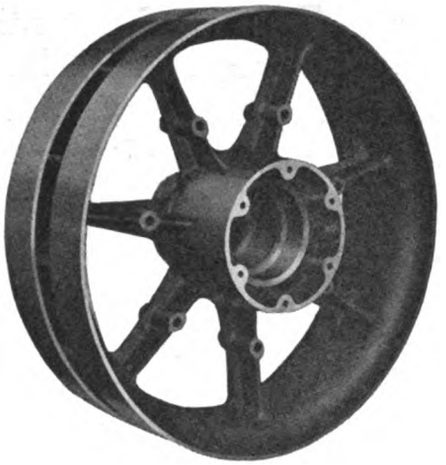

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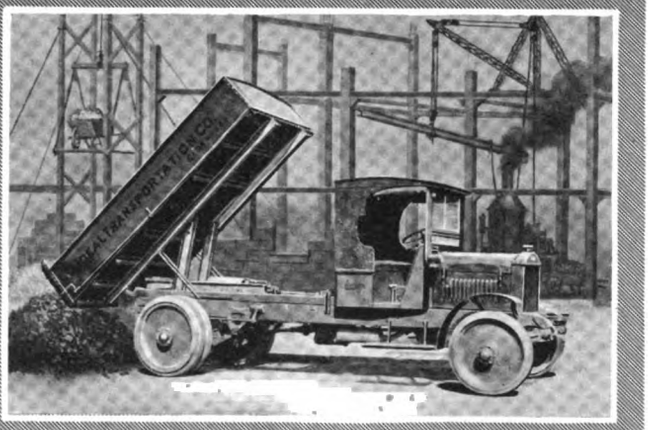

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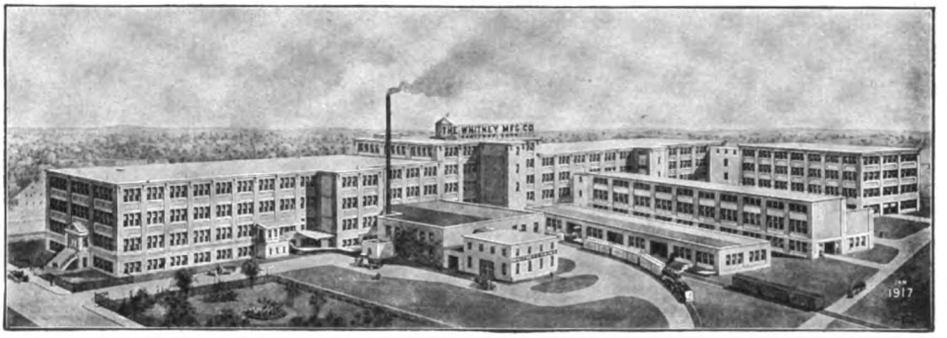

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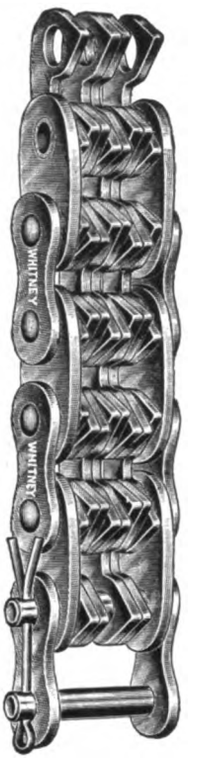

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